

THE AUSTRALIAN SPECIES OF *CHIMARRA* STEPHENS  
(TRICHOPTERA: PHILOPOTAMIDAE)

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Abstract

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Descriptions, keys and a checklist are provided for males of 26 species of the cosmopolitan caddisfly genus *Chimarra* (Philopotamidae), including 23 new species from Australia. Females of 22 species are also keyed and described.

Introduction

The widespread caddisfly genus *Chimarra* Stephens, 1829 is one of the largest genera in the order Trichoptera with about 400 species described, but with numbers of species approaching 600 with works in progress (Blahnik, 1997; Morse, 1999). The genus *Chimarra* is diverse, common and widespread in faster flowing areas of rivers and streams in Australia, although only four species have been described previously, *C. australis* Navas, 1923, *C. australica* Ulmer, 1916, *C. monticola* Kimmins, 1953 and *C. uranka* Mosely, 1953. In reference to *C. australis* Navas, described only from a female, Kimmins stated that he was “unable to recognize this species from the description” (Kimmins in Mosely and Kimmins, 1953: 404); and the whereabouts of the holotype female is unknown (Neboiss, 1988: 212). This species is not considered further in this paper.

Cartwright (1990) described and figured females of *C. australica* and *C. monticola* from Victoria. Wells (1991) partly figured four species of *Chimarra* in a key to Northern Territory (Alligator Rivers Region) Trichoptera. Wells and Cartwright (1993) listed four species of *Chimarra* amongst Trichoptera collected from Cape York Peninsula, north Queensland. Walker et al. (1995) listed nine species of *Chimarra*, including six undescribed species, from the Queensland Wet Tropics. Cartwright (1997) listed 24 *Chimarra* ‘species’ in a checklist, and noted that the only record of *Chimarra* from Tasmania was a of single male of *C. monticola*.

In this taxonomic revision of the Australian *Chimarra* nearly 9400 male and female specimens were examined and referred to 26

species. Half of these specimens belong to *C. uranka*, while another 20% were identified as *C. karakara* sp. nov. Distributions of Australian species are summarised in Table 1. The breakdown in distribution of Australian species in each province and region is: two (endemic) species recorded from the Eyrean province (Pilbara region of North Western Australia, N-WA); a total of 21 species recorded within the Torresian province of northern Australia, including seven species from the Kimberley region of N-WA, nine species from the northern part of the Northern Territory (N-NT), 11 species in northern Queensland (N-Qld); and five species in the Bassian province of southeastern Australia (SE-Qld, New South Wales, Victoria and Tasmania) (Table 1). *Chimarra* is recorded from all Australian states and territories except South Australia and the Australian Capital Territory and is also not recorded from southwestern Australia. Most of the *Chimarra* species described are from the warmer northern part or Torresian province of Australia. Neboiss and Wells (1998) found a similar preponderance of northern species in the Australian leptocerid genus *Triaenodes*, and suggested that *Triaenodes* may be a relatively recent arrival in Australia. *Chimarra* is well represented in the tropical and subtropical areas of Asia and Africa, and the genus as a whole can be described as warm adapted (Blahnik, 1998). The distribution of *Chimarra* differs from that of the other Australian philopotamid genus *Hydrobiosella* Tillyard, 1924, which is most common in southeastern Australia, particularly Tasmania and also occurs in southwestern Australia. The ‘southern’ distribution of *Hydrobiosella* is more indicative of an older Gondwanan origin.

Table 1. Eyrean (western-central), Torresian (northern) and Bassian (south-eastern) species of Australian *Chimarra*.

Eyrean species (Pilbara, northwestern WA)

*C. humiularis*, *C. yoolumba*

Torresian species (Kimberley, north-western WA, NT, northern Qld)

*C. adahuna*, *C. akruna*, *C. bibaringa*, *C. bungoona*, *C. kaiya*, *C. karakara*, *C. larapiinta*, *C. locolo*, *C. mouldsi*, *C. nabilla*, *C. natalicia*, *C. nevoissi*, *C. orunbera*, *C. pillara*, *C. pita*, *C. ranika*, *C. stelairae*, *C. wooroonoora*, *C. yandala*

Bassian species (southeastern Australia including Tasmania)

*C. kewarra*, *C. monticola*, *C. tallawalla*

Species common to both Bassian and Torresian provinces (eastern and northern Australia)

*C. australica* (mainly Bassian), *C. uranka* (mainly Torresian)

Ross (1956) and Blahnik (1997, 1998) have published studies on the phylogeny and biogeography of various groups and subgroups of *Chimarra*. Ross (1956) studied species of *Chimarra* from higher altitudes, although he noted that *Chimarra* is not primarily a montane group. He stated that from an Asiatic ancestor, a group spread throughout Asia and to Australia and Africa, where offshoot lines occur. Blahnik (1998) in a study of Neotropical *Chimarra*, suggested that New World *Chimarra* may represent a monophyletic group with several lineages, and that a phylogenetic analysis of Old World species is required to resolve unanswered questions. Blahnik (1998) postulated a common northern South America-Africa origin before continent separation to explain the Old and New World distribution of *Chimarra*.

Common but often variable key characteristics of the Australian fauna include: eastern Australian species with colour uniformly brown to almost black and northern Australian species with pale yellowish head, often with a brownish triangular area between the ocelli and darker wings and body; wings usually unicolorous, length of forewing in males 3.7–8.5 mm, females usually slightly larger; forewing commonly with Rs curved basal to discoidal cell, which often has an enlarged node or thickened veins; hindwing with or without fork 1, including at least one species where this character seems to be variable within the species; male genitalia with the ventral process on segment IX usually short, keel-like; tergum X usually mostly membranous mesally, not divided, with mesal or lateral lobes or processes; inferior appendages variable, usually short, in some species more elongate; phallus often with obvious embedded or projecting phallic or endothecal spines; female genitalia usually short with segment VIII membranous dorsally; sternum IX with paired membranous or partly sclerotised plates; cerci usually short. Size, body

and wing colour can be useful characters, but are variable. Colour should be considered with caution since the colour often fades with time in alcohol. The Australian species can be placed in groups based mainly on male genitalic characters. Some species are placed in groups which may be superficially similar but not necessarily natural or monophyletic. The groups can be characterised as follows: species with a 'pale window' (an area of semi-transparent membrane) in the wings – *C. humiularis* and *C. locolo*; species with hindwing with fork 1 present, relatively elongate inferior appendages and elongate lateral processes of tergum X usually with distinct 'barb-like projections' without apparent sensilla – *C. kaiya*, *C. bungoona*, *C. larapiinta*, *C. orunbera*, *C. pillara* and *C. yandala*; species with a relatively elongate ventral process projecting between bases of the inferior appendages – *C. natalicia* and *C. nevoissi*; species with a single large dorsal phallic projection or apicodorsal extension of the phallosome – *C. ranika* and *C. uranka*; species with a pair of elongate phallic spines – *C. tallawalla* and *C. wooroonoora*; species with one or two pairs of pigmented mesal processes on tergum X (and/or tergum IX) and dorsal sclerotised 'hood-like' projection on the phallus – *C. adahuna*, *C. yoolumba*, *C. nabilla*, *C. akruna* and *C. pita*; uniformly dark species without the above characters but with relatively slender upturned inferior appendages – *C. monticola*, *C. australica* and *C. kewarra*; and the rest (probably not a natural group), again darker species typically with shorter inferior appendages – *C. mouldsi*, *C. bibaringa*, *C. karakara* and *C. stelairae*.

Most of the material studied was made available by Dr Arturs Neboiss. Depositories for specimens are abbreviated as follows: Museum Victoria, Melbourne (NMV), Australian National Insect Collection, Canberra (ANIC), the Natural History Museum, London (BMNH),



Naturhistoriska Riksmuseet, Stockholm (NRS), Museum and Art Galleries of the Northern Territory, Darwin (NTM) and the Queensland Museum, Brisbane (QM). All specimens, including types, mentioned in the text are lodged in the NMV unless stated otherwise.

Males and females of each species are most readily distinguished by genitalic features, often requiring clearing of the abdomen in potassium hydroxide. Females were paired with respective males on the basis of similarities in coloration, particularly on the head, and on wing venation and locality and some were associated by rearing out from larvac or pupae.

Figured specimens are identified by the notebook numbers of Dr Arturs Neboiss (NMV), prefix PT-; or the author; prefix CT-. Terminology used generally follows that of Nielsen (1957, 1981), and Blahnik (1998). Abbreviations for

genitalic parts are indicated on Figs 2–4 (male) and 80–81 (female) and additionally where necessary. Typically, setae or spines are illustrated only on the right side of the figure (as viewed) to enable a better view of the underlying structures.

Names of prolific collectors have been abbreviated in the text as follows: J.E. Bishop – JEB; J. Blyth – JB; P. Dostine – PD, M.S. Moulds – MSM; A. Neboiss – AN; P. Suter – PS; A. Wells – AW.

### *Chimarra* Stephens

*Chimarra* Stephens, 1829: 318.—Mosely and Kimmins, 1953: 398.

*Type species.* *Phryganea marginata* C. Linnaeus, 1767, by monotypy.

*Diagnosis.* A revised diagnosis of the genus *Chimarra* was provided recently by Blahnik (1998: 14).

### Key to males and females of species of *Chimarra* from Australia

1. Males..... 2
- Females ..... 27
2. Forewing with 'pale window' (Figs 1, 1a)..... '*C. luminaris*-group' ... 3
- Forewing without 'pale window' ..... 4
3. Inferior appendages in lateral view, sub-rectangular, not tapered apically (Fig. 2); hindwing without 'pale window' (Fig. 1) N-WA (Pilbara)..... *C. luminaris*
- Inferior appendages in lateral view, not subrectangular, tapered apically (Fig. 5); hindwing with 'pale window' (Fig. 1a) N-NT..... *C. locolo*
4. Hindwing usually with fork 1 present; lateral processes of tergum X elongate, usually with at least 1 'barb-like projection', usually longer than inferior appendages; inferior appendages relatively long with small digitiform projection apically (Figs 8, 11, 17)..... '*C. kaiya*-group' ... 5
- Hindwing usually with fork 1 absent; lateral processes of tergum X, if present, usually short without 'barb-like projections', usually shorter than inferior appendages; inferior appendages usually short, robust (Figs 26, 35) ..... 10
5. Mesal process of tergum X single in dorsal view (Figs 10, 13, 16, 19)..... 6
- Mesal processes of tergum X paired in dorsal view (Figs 22, 25)..... 8
6. Inferior appendages, in lateral view, angled strongly near midventral margin; lateral processes of tergum X with 2 small subapical 'barb-like projections' (Figs 8, 10) N-NT, N-Qld..... *C. kaiya*
- Inferior appendages, in lateral view, not angled strongly near mid ventral margin; lateral processes of tergum X without or with 1 subapical 'barb-like projection' or only weakly developed (Figs 11, 13, 14, 16, 17, 19) ..... 7
7. Phallus with pair of projecting endotheal spines obvious dorsally (Fig. 13); lateral processes of tergum X with relatively large apical hook and subapical 'barb-like projection' (Figs 11, 13) N-NT..... *C. bungoona*
- Phallus without pair of projecting endotheal spines apparent dorsally (Figs 16, 19); lateral processes of tergum X without relatively large apical hook or 'barb-like projections', paired processes not apparent or only weakly developed (Figs 14, 16, 17, 19)..... 8

8. Lateral processes of tergum X with paired processes weakly developed and without dorsal branch (Figs 14, 16); hindwing with fork 1 present, N-WA....  
.....*C. larapinta*
- Lateral processes of tergum X without paired processes but with distinctive dorsal branch (Figs 17, 19); hindwing with fork 1 absent, N-WA.....  
.....*C. orumbera*
9. Lateral processes of tergum X with relatively large upturned apical hook (Fig. 20); paired mesal processes of tergum X relatively short (Fig. 22) N-WA .....*C. pillara*
- Lateral processes of tergum X without upturned apical hook (Fig. 23); paired mesal processes of tergum X relatively long (Fig. 25) N-Qld.....  
.....*C. yandala*
10. Ventral process of segment IX relatively elongate, acute, projecting between bases of inferior appendages (Figs 26, 27, 29, 30).... '*C. natalicia*-group'... 11
- Ventral process of segment IX relatively short, obtuse, not projecting between bases of inferior appendages (Figs 32, 33, 35, 36) ..... 12
11. Inferior appendages in ventral view, with digitiform apical mesal projection, narrowly separated from the subapical angle, forming a deep notch (Fig. 27) N-Qld.....*C. natalicia*
- Inferior appendages in ventral view, without digitiform apical mesal projection, but with basal mesal projection widely separated from the apical angle, forming a wide notch (Fig. 30) N-Qld.....*C. nevoissi*
12. Phallus with a single projecting, elongate, dorsal 'phallic projection' or 'apicodorsal extension of the phallotheca' (Figs 32, 32a, 34, 35, 35a, 37).....  
..... '*C. uranka*-group'... 13
- Phallus with paired projecting 'phallic spines' or spines not apparent (Figs 38, 38a, 40, 41, 41a, 43)..... 14
13. Mesal processes of tergum X relatively short, not reaching apex of dorsal 'phallic projection' (Figs 32, 34) Qld, N-NT, N-WA .....*C. uranka*
- Mesal processes of tergum X relatively long, reaching apex of dorsal 'phallic projection' (Figs 35, 37) N-NT.....*C. ranuka*
14. Phallus with paired long and slender 'phallic spines' (Figs 38, 38a, 41, 41a) .....  
..... '*C. tallawalla*-group'... 15
- Phallus without paired projecting long and slender 'phallic spines' apparent, single to many endothecal spines may be present (Figs 44, 50) ..... 15
15. Phallus with paired very slender, very elongate 'phallic spines' dorsally, attached near base of phallotheca, often extending past apex of phallus (Figs 38–40, 38a), although sometimes withdrawn and so not as apparent (Figs 38b, 40a) E-NSW, SE-Qld .....*C. tallawalla*
- Phallus with paired slender, long 'phallic spines' laterally, attached near base of endotheca, never extending past apex of phallus (Figs 41, 41a, 43) N-Qld .....  
.....*C. wooroonooran*
16. Mesal processes of tergum X or IX in dorsal view, present as 1 or 2 pairs of relatively elongate spine-like projections; phallus with dorsal sclerotised 'hood-like' projection (Figs 46, 49)..... '*C. adaluma*-group'... 17
- Mesal processes of tergum X in dorsal view, not present as 1 or 2 pairs of (usually dark) relatively elongate spine-like projections (Figs 61, 64)..... 21
17. Mesal processes of tergum X in dorsal view, present as one pair of spine-like projections (Fig. 46) N-WA.....*C. adaluma*
- Mesal processes of tergum X in dorsal view, present as two pairs of spine-like projections (Figs 49, 52, 55) ..... 18
18. Inner pair of mesal processes of tergum X relatively widely separated, situated adjacent to outer pair (Fig. 49) N-WA (Pilbara).....*C. yoolumba*
- Inner pair of mesal processes of tergum X not relatively widely separated, not usually situated adjacent to outer pair (Figs 52, 55, 58)..... 19



19. Inner pair of mesal processes of tergum X shorter than outer pair (Fig. 52) N-WA, N-NT ..... *C. nabilla*
- Inner pair of mesal processes of tergum X as long as or longer than outer pair (Figs 55, 58).....20
20. Outer pair of mesal processes of tergum X as long as inner pair (Fig. 52) N-NT..... *C. akrma*
- Outer pair of mesal processes of tergum X about two-thirds as long as inner pair (Fig. 58) N-WA, N-NT..... *C. pita*
21. Inferior appendages in lateral view, relatively long, tapered gradually apically to acute apices (Figs 59, 62, 65), and in ventral view apices inflexed (Figs 60, 63, 66) ..... *C. monticola*-group'...22
- Inferior appendages in lateral view, relatively short, not usually tapered gradually apically to acute apices (Figs 68, 71, 74), and in ventral view apices not usually inflexed (Figs 69, 72, 75)..... *C. mouldsi*-group'.... 24
22. Lateral processes of tergum X not produced into obvious projections (Figs 59, 61) NSW, Vic., Tas..... *C. monticola*
- Lateral processes of tergum X produced into obvious projections, slightly hooked apically (Figs 62, 64, 65, 67).....23
23. Lateral processes of tergum X, with relatively short, upturned or out-turned apices (Figs 62, 63, 64, 64b,c); phallus with a ventral process or 'phallotremal sclerite' (Figs 62, 63) E-Aust ..... *C. australica*
- Lateral processes of tergum X with relatively long, upturned or out-turned apices; phallus without a ventral process (Figs 65, 66) SE-Qld ..... *C. kewarra*
24. Inferior appendages in ventral view, subquadrate, truncate apically (Figs 69, 72).....25
- Inferior appendages in ventral view, not subquadrate, not truncate apically (Figs 75, 78).....26
25. Inferior appendages in lateral view, subquadrate, truncate apically (Fig. 68) N-Qld ..... *C. mouldsi*
- Inferior appendages in lateral view, not subquadrate, not truncate apically (Fig. 71) N-Qld ..... *C. stclairae*
26. Lateral processes of tergum X apically with obvious elongate processes ventral to phallus; apex of phallus without obvious dark spines (Figs 74, 75) N-Qld..... *C. bibaringa*
- Lateral processes of tergum X without elongate processes ventral to phallus; apex of phallus with (three) obvious small dark spines (Fig. 77, 78) N-Qld ..... *C. karakara*
27. Forewing with 'pale window' (Figs 1, 1a)..... *C. luminaris*-group'....28
- Forewing without 'pale window' .....29
28. Sternum IX ventrolaterally with distinctive 'knob-like processes' (Figs 80, 81); hindwing without 'pale window' (Fig. 1) N-WA (Pilbara)... *C. luminaris*
- Sternum IX ventrolaterally without distinctive 'knob-like processes' (Figs 82, 83); hindwing with 'pale window' (Fig. 1a) N-NT..... *C. locolo*
29. Hindwing usually with fork 1 present; cerci pigmented; genitalia usually relatively long (Figs 85, 87, 89)..... *C. kaiya*-group'....30
- Hindwing usually without fork 1 present; cerci usually unpigmented; genitalia relatively short (Figs 95, 97, 99).....34
30. Posteroventral margin of sternum VIII with 2 areas of setae not separated by small notch (Figs 85, 87).....31
- Posteroventral margin of sternum VIII with 2 areas of setae separated by small notch (Figs 89, 91, 93).....32
31. Cerci and genitalia relatively elongate (Figs 84, 85); hindwing with fork 1 absent; N-WA, N-NT..... *C. orumbera*
- Cerci and genitalia not relatively elongate (Figs 86, 87); hindwing with fork 1 present; N-NT, N-Qld..... *C. kaiya*

32. Posteroventral margin of sternum VIII with small notch about as long as wide (Fig. 89); N-NT ..... *C. bungoona*
- Posteroventral margin of sternum VIII with small notch about twice as long as wide (Figs 91, 93) ..... 33
33. Posterior margin of sternum IX with rounded 'corners' (Fig. 91) N-Qld..... *C. yandala*
- Posterior margin of sternum IX with angular 'corners' (Fig. 93) N-WA..... *C. pillara*
34. Head pale with body and wings usually darker (N-Australia)..... 35
- Head dark with body and wings usually dark (E-Australia) ..... 39
35. Sternum IX ventrally with obvious pigmented areas (Figs 95, 97).....36
- Sternum IX ventrally without obvious pigmented areas (Figs 99, 101).....37
36. Sternum IX ventrally with obvious pair of pigmented triangular shaped areas (Fig. 95) Qld, N-NT, N-WA..... *C. uranka*
- Sternum IX ventrally with pigmented areas not triangular (Fig. 97) N-NT, N-WA..... *C. akruna*
37. Posteroventral margin of sternum VIII with 2 areas of setae relatively widely separated (Fig. 99); N-WA, N-NT..... *C. pita*
- Posteroventral margin of sternum VIII with 2 areas of setae relatively narrowly separated (Figs 101, 103);.....38
38. Posterior margin of sternum IX rounded (Fig. 101) N-WA (Pilbara)..... *C. yoolhunba*
- Posterior margin of sternum IX angular (Fig. 103) N-WA, N-NT..... *C. uabilla*
39. Posteroventral margin of sternum VIII with 2 areas of setae separated by notch (Fig. 105) N-Qld..... *C. natalicia*
- Posteroventral margin of sternum VIII with 2 areas of setae not separated by notch (Figs 107, 109) ..... 40
40. Sternum IX ventrolaterally with pair of 'pockets' (Figs 106, 107) E-NSW, SE-Qld ..... *C. tallawalla*
- Sternum IX ventrolaterally without pair of 'pockets' (Figs 109, 111, 113)... 41
41. Posteroventral margin of sternum VIII with pair of pigmented sclerites joined to form 'T-shaped' pigmented area (Fig. 109) N-Qld ..... *C. nevoissi*
- Posteroventral margin of sternum VIII with pair of pigmented sclerites not joined to form 'T-shaped' pigmented area (Figs 111, 113).....42
42. Sternum IX ventrally without obvious pair of pigmented areas (Fig. 111) N-Qld ..... *C. wooroonoonan*
- Sternum IX ventrally with obvious pair of pigmented areas or depressions (Figs 113, 115)..... 43
43. Sternum IX ventrally with pair of small squarish depressions (Fig. 113) N-Qld..... *C. stclairae*
- Sternum IX ventrally without pair of small squarish depressions (Figs 115, 117) ..... 44
44. Sternum IX ventrally with obvious pair of pigmented areas relatively widely separated (Figs 115, 117)..... 45
- Sternum IX ventrally with obvious pair of pigmented areas relatively narrowly separated (Figs 119, 121)..... *C. monticola-group*... 46
45. Posteroventral margin of sternum VIII with pair of pigmented sclerites widely separated; sternum IX ventrally with pair of pigmented areas with length less than width (Fig. 115) N-Qld..... *C. mouldsi*
- Posteroventral margin of sternum VIII with pair of pigmented sclerites narrowly separated; sternum IX ventrally with pair of pigmented areas with length greater than width (Fig. 117) N-Qld..... *C. karakara*



46. Sternum IX ventrally with pair of non-triangular pigmented areas or sclerites (Fig. 119) Vic., E-NSW, E-Qld.....*C. australica*  
 — Sternum IX ventrally with pair of triangular pigmented areas or sclerites (Figs 121, 123) .....47  
 47. Sternum IX ventrally with pair of triangular pigmented areas or sclerites with length greater than width (Fig. 121) SE-Qld.....*C. kewarra*  
 — Sternum IX ventrally with pair of triangular pigmented areas or sclerites with length less than width (Fig. 123) E-NSW, Vic., Tas.....*C. monticola*

### *Chimarra luminaris*-group

The *C. luminaris*-group of two species, *C. luminaris* and *C. locolo*, is characterised primarily by forewings with 'pale window' near discoidal cell. Other common but not exclusive characters are pale head and brownish body and wings, hindwing with fork 1 absent, forewing with vein Rs thickened and curved slightly basal to discoidal cell; male genitalia tergum X with a pair of relatively widely separated mesal processes, phallus with large, protruding ventral or apical spine(s), ventral process on segment IX small and keel-like; female genitalia relatively short and broad. Both members of this group are from northern Australia, one each from N-WA and N-NT.

### *Chimarra luminaris* sp. nov.

Figures 1–4, 80, 81

*Chimarra* sp. nov. CT-262.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia, Fortescue R., Millstream, S of Roebourne, 22 Feb 1977, M.S. and B.J. Moulds (NMV, T-17548). Paratypes, 24 males (specimen CT-262 figured), 15 females (specimen CT-263 figured), collected with holotype (NMV).

*Other material examined.* Western Australia, 9 males, 2 females, Lockyer Gorge, Harding R., Pilbara, 19 Oct 1979, JB; 24 males, 12 females, Millstream, 21–22 Apr 1972, N.R. Mitchell (ANIC); 1 male, 1 female, Fortescue R., Millstream National Park, 21°34'S, 117°03'E, 24–25 Apr 1992, P.S. Cranston; 16 males, 16 females, Fortescue R., Millstream, S of Roebourne, 22 Feb 1977, M.S. and B.J. Moulds; 7 males, 6 females, Crossing Pool, Millstream, Pilbara, 21 Oct 1979, JB; 2 male pupae, Pilbara, Ashburton R., Wallbrook Pool, 22°28.54'S, 116°28.05'E, date?, P. Cranston (ANIC); 2 males, 1 female, 28 km NE Tom Price, 22°30'S, 117°58'E, 26 Sep 1995, D.C.F. Rentz and J. Otto (ANIC); 7 males, 3 females, Wittenoom Gorge, Hamersley Range National Park, 20 Feb 1977, M.S. and B.J. Moulds; 6 males, 1 female, Fortescue Falls, Hamersley Range National Park, 27 Oct 1979, JB; 1 male, Hamersley National Park, Fortescue Falls, 23°38'S, 118°33'E, 23 Apr 1992, Cranston and Gullan (ANIC).

*Diagnosis.* *Chimarra luminaris* resembles *C. locolo* in possessing 'pale semi-transparent window' in the forewing, but it is distinguished by the absence of the 'pale window' in the hindwing.

*Description.* Head pale, body and wings brownish to dark brown, forewings with 'pale semi-transparent window' near discoidal cell; hindwings without 'pale window'; length of forewing: male 5.0–5.4 mm, female 5.3–7.1 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell (Fig. 1).

Male. Ventral process on segment IX small, keel-like; inferior appendages short, in lateral view subrectangular, length about 1.5 times width (Fig. 2), apices slightly inflexed; mesal processes of tergum X short, usually with bifid apices, sometimes asymmetrical; lateral processes of tergum X with 3 small apical lobes; phallus with robust hooked endotheal spine projecting at apex and with dorsal sclerotised 'hood-like' projection (Figs 2–4).

Female. Female genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with dark sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively widely separated, with connecting posterior margin of segment VIII fairly straight and without notches. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of faint, oblong pigmented areas and laterally with distinctive pairs of knob-like processes. Tergum X forming 2 lobes with numerous setae, each with short apical cercus (Figs 80, 81).

*Etymology.* *Luminaris* – Latin for window (wings).

*Remarks.* *Chimarra luminaris* has been collected from five sites in the Pilbara region of northern Western Australia (latitudinal range 21°00'–23°38'S).

*Chimarra locolo* sp. nov.

Figures 1a, 5–7, 82, 83

*Chimarra* sp. nov. E.—Cartwright, 1997: 17.

*Type material.* Holotype male, Northern Territory, Litchfield National Park, UV light, 6 Jun 1991, Wells and Webber (NMV, T-17588). Paratypes. 21 males (specimen CT-279 figured), 22 females (specimen CT-299 figured), collected with holotype (NMV, NTM).

*Other material examined.* Northern Territory. 1 female, Jim Jim Ck. 3 km below falls, Kakadu National Park, 1 Sep 1979, JB; 1 male, Berry Springs, 12°42'S, 130°58'E, 7 May 1992, A.W. (NTM); 3 males, 2 females, Florence Falls, Litchfield National Park, MV lt, 9 Apr 1991, Horak and Wells (NTM); 7 males, 13 females, Litchfield Park, MV light, 3 Apr 1991, J. Webber and R. De Jong (NTM); 1 male, Devil Devil Ck, 70 km SW Daly R. Mission, 23 Aug 1979, JB; 1 male, Katherine R. Gorge National Park, 26 Jan 1977, M.S. and B.J. Moulds.

*Diagnosis.* *Chimarra locolo* resembles *C. linnianaris* in possessing 'pale semi-transparent window' in the forewing, but it is distinguished by the presence of the 'pale window' in the hindwing.

*Description.* Head pale, with brown triangular area between ocelli, body and wings brownish, fore- and hindwings with 'pale window' centred near discoidal cell; length of forewing: male 4.7–5.2 mm, female 4.9–6.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell (Fig. 1a).

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, broadbased, narrowing strongly at about middle to slender apices (Fig. 5); mesal pair of processes of tergum X and IX margin slender, widely spaced (Fig. 7); phallus robust with asymmetrical pair of strong, serrate-edged endothecal spines projecting ventrally (Fig. 6).

Female. Female genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with dark sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII fairly straight and without notches. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of faint, oblong pigmented areas. Tergum X comprising 2 setose lobes with numerous setae, each with short apical cercus (Figs 82, 83).

*Etymology.* *Locolo* – Northern Territory Aboriginal word for circle (wings).

*Remarks.* This species has been collected from the northern half of the Northern Territory (latitudinal range 12°42'–14°29'S).

*Chimarra kaiya*-group

The *C. kaiya*-group of six species, *C. kaiya*, *C. bungoona*, *C. larapinta*, *C. orumbera*, *C. pillara* and *C. yandala*, is characterised primarily by male genitalia with inferior appendages elongate and slender with an apical finger-like process, tergum X with elongate lateral processes, often with 'barb-like projections'; female genitalia in all but one species (*C. kaiya*) relatively elongate with pigmented cerci. Other common but not exclusive characters are pale head and brownish body and wings, wings unicolorous, hindwing with fork 1 present (except *C. orumbera*), forewing with vein Rs thickened and curved slightly basal to discoidal cell, male genitalia with tergum X either with a pair of mesal processes or single mesal process, phallus with large, often protruding spine(s), ventral process on segment IX small and keel-like. All members are from northern Australia.

*Chimarra kaiya* sp. nov.

Figures 8–10, 86, 87

*Chimarra* sp. C.—Wells, 1991: 20.*Chimarra* sp. n. C.—Wells and Cartwright, 1993: 227.*Chimarra* sp. nov. CT-270.—Cartwright, 1997: 17.

*Type material.* Holotype male, Northern Territory, ARRS Radon Springs, lt tr., 13–14 Apr 1988, AW and PS (NMV, T-17632). Paratypes. 21 males (specimen CT-270 figured), 6 females (specimen CT-297 figured), collected with holotype (NMV).

*Other material examined.* Northern Territory, Kakadu National Park—Radon Springs, Baroalba Springs, Koongarra, 15 km E of Mt Cahill, Stag Ck at BHP camp, Jim Jim Falls campsite, Litchfield National Park—Walker Ck, Ada Ck (ANIC, NTM, NMV).

Queensland. Cape York Peninsula—Loekerbie Scrub, Jardine R., Heathlands area, Iron Range, McIlwraith Range, Mt Webb National Park (ANIC, NMV, QM).

*Diagnosis.* In general form of male genitalia, *C. kaiya* resembles others in the group, but it is distinguished by the strongly angled inferior appendages and the lateral processes of tergum X with 2 subapical 'barb-like projections' and no apical hook.

*Description.* Head pale, body and wings brownish; length of forewing: male 4.7–6.1 mm, female



5.0–6.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 1, 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view long, length about 3.5 times width, angled strongly near middle of ventral margin, with small digitiform process apically (Fig. 8); single mesal process of tergum X short, simple in lateral view (Fig. 10); lateral processes of tergum X longer than inferior appendages, with 2 small dorsal 'barb-like projections' subapically and towards middle, no apical hook; phallus robust with 2 long slightly curved endothecal spines projecting at apex (Figs 8, 9).

Female. Female genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with dark sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII fairly straight and without notches. Segment VIII dorsally with a membranous area almost dividing segment. Ninth sternum without any pigmented areas. Tergum X forming 2 lobes with numerous setae, each with a short, pigmented apical cercus (Figs 86, 87).

*Etymology.* *Kaiya* – Queensland Aboriginal word for spear with two barbs (lateral processes on tergum X).

*Remarks.* This is a common and widespread species across Cape York Peninsula and northern Northern Territory (latitudinal range 10°46'–15°14'S).

### *Chimarra bungoona* sp. nov.

Figures 11–13, 88, 89

*Chimarra* sp. D.—Wells, 1991: 20.

*Chimarra* sp. nov. CT-272.—Cartwright, 1997: 17.

*Type material.* Holotype male, Northern Territory, Radon Springs, lt tr., 14 Apr 1989, AW and PS (NMV, T-17660). Paratypes. 1 male (CT-272, drawn specimen), Randon (Radon?) Ck, Kakadu National Park, 3 Sep 1979, JB (NMV); 2 females (specimen CT-298 figured), ARRS Radon Springs, lt tr., 18–19 May 1988, AW and PS (NMV).

*Other material examined.* Northern Territory, 1 male, ARRS Radon Springs, lt tr., 13–14 Apr 1988, AW and PS? (NTM); 2 males, Koongarra, 15 km E of Mt Cahill, 12°52'S, 132°50'E, 12–13 Jun 1973, J.C. Cardale (ANIC); 2 males, Litchfield National Park, Walker Ck, UV lt, 18–19 Apr 1992, AW (NTM); 1 male, Litchfield National Park, Ada Ck at jump up, lt tr., 24–25 Jun

1992, Wells and Webber (NTM); 2 males, Umbrawarra Gorge, 14°00'S, 131°38'E, MV lt, 23 Aug 1982, J. and I. Archibald (ANIC).

*Diagnosis.* This species closely resembles others in the group in general form of male genitalia, but it is distinguished by the combination of a single mesal process on tergum X and lateral processes of tergum X with subapical 'barb-like projection' and apical hook.

*Description.* Head pale with brown triangular area between ocelli, body and wings brownish; length of forewing: male 4.9–5.2 mm, female 4.9–6.3 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 1, 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view long, length about 3.5 times width, not angled strongly near middle of ventral margin, with small digitiform process apically (Figs 11, 12); single mesal process of tergum X short, slender (Fig. 13), simple in lateral view; lateral processes of tergum X longer than inferior appendages, with relatively large dorsal 'barb-like projection' subapically and apical hook; phallus robust with pair of endothecal spines projecting dorsally and a single spine projecting apically (Figs 11, 13).

Female. Female genitalia relatively long, elongate; sternum VII with small keel-like process. Posterolateral margin of segment VIII with dark sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII fairly straight and with small notch. Segment VIII dorsally with a membranous area almost dividing segment. Ninth sternum without any pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively long, pigmented apical cercus (Figs 88, 89).

*Etymology.* *Bungoona* – Australian Aboriginal word for sandy creek (typical habitat).

*Remarks.* *Chimarra bungoona* is known from five sites in the northern Northern Territory (latitudinal range 12°45'–14°00'S).

### *Chimarra larapinta* sp. nov.

Figures 14–16

*Chimarra* sp. nov. U.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia, 'Marun' CALM site 8/4, Prince Frederick Harbour, 15°00'S, 125°21'E, at light, 6–11 Jun 1988, I.D.

Naumann (ANIC). Paratype. 1 male (specimen CT-308 figured), collected with holotype (ANIC).

*Other material examined.* Western Australia. 1 male, nr Mitchell Plateau airfield, 14°48'S, 125°49'E, at light, 15 May 1983, J.C. Cardale (ANIC); 2 males, 1 female, Carson Escarpment, 14°49'S, 126°49'E, Drysdale 1975 Survey site B1, 9–15 Aug 1975, I.F.B. Common and M.S. Upton (ANIC); 1 male (specimen CT-289, genitalia missing), 'Marun' CALM site 8/4, Prince Frederick Harbour, 15°00'S, 125°21'E, at light, 6–11 Jun 1988, I.D. Naumann (ANIC); 7 males, CALM site 28/3, 4 km W of King Cascade, 15°35'S, 128°15'E, 17–20 Jun 1988, T.A. Weir (ANIC).

*Diagnosis.* *Chimarra larapiuta* closely resembles others in the group in general form of male genitalia, but it is distinguished by the combination of a single mesal process on tergum X and lateral processes of tergum X with paired subapical 'projections' only weakly developed.

*Description.* Head, body and wings pale; length of forewing: male 4.6–4.9 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 1, 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, long, length about 3.5 times width, slightly narrowed but not angled strongly near middle of ventral margin, with small digitiform process dorsoapically (Figs 14, 16); single mesal process of tergum X short, triangular (Fig. 16), simple in lateral view (Fig. 14); lateral processes of tergum X longer than inferior appendages, with paired subapical projections weakly developed laterally (Fig. 16); phallus robust with short curved ventral endothecal spine visible subapically (Figs 14, 15).

Female unknown.

*Etymology.* *Larapiuta* – Australian Aboriginal word for flowing water (typical habitat).

*Remarks.* This species has been collected from four sites in the Kimberley region of northern Western Australia (latitudinal range 14°48'–15°35'S).

### *Chimarra orumbera* sp. nov.

Figures 17–19, 84, 85

*Chimarra* sp. nov. CT-266.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia. Kimberley, Prince Regent R., 15°47'S, 125°24'E, May 1985, E. Bloomfield (NMV, T-17664). Paratypes. Western Australia. 5 males, collected with holotype (NMV); 1 male (specimen CT-266 figured), Barnett R. Gorge, Barnett Station, Kimberley, 1 Oct 1979, J.B.

(NMV); 2 males, same data (NMV); 1 male, 1 female (specimen CT-316 figured), Manning R. nr Mt Barnett, 16°40'S, 125°56'E, 8 Sep 1996, I. Edwards (NMV); 1 female, Mitchell Plateau, Lone Dingo Ck, trib. of Mitchell R., 17 Feb 1979, J.E.B. (NMV).

*Other material examined.* Western Australia. 2 males, 1 female, CALM site 13/4, 12 km S of Kalumburu Mission, 14°25'S, 126°38'E, 7–11 Jun 1988, T.A. Weir (ANIC); 1 male, 'Marun' CALM site 8/4, Prince Frederick Harbour, 15°00'S, 125°21'E, at light, 6–11 Jun 1988, I.D. Naumann (ANIC); 11 males, CALM site 28/3, 4 km W of King Cascade, 15°35'S, 128°15'E, 17–20 Jun 1988, T.A. Weir (ANIC); 1 male, El Questro Station, Chamberlain R. pool, 15°58'S, 127°56'E, 26 Aug 1996, I. Edwards; 2 males, Backsten Ck, S of Prince Regent Reserve, 16°00'S, 125°29'E, 6 Sep 1996, I. Edwards; 1 female, Drysdale R. headwaters, 30 km NW Mt Elizabeth HS, 30 Sep 1979, JB; 4 males, 1 female, Drysdale R., upper reaches, 16°09'S, 125°58'E, 7 Sep 1996, I. Edwards; 1 male, 1 female, Adcock Gorge, Gibb R.-Derby Rd, Kimberley, 2 Oct 1979, JB; 1 male, Bell Gorge, Melaleuka Hole, 17°01'S, 125°14'E, 13 Sep 1996, I. Edwards; 1 female, King Edward R., 14°54'S, 126°12'E, 3 Sep 1996, I. Edwards.

*Diagnosis.* *Chimarra orumbera* is distinguished in the group by the absence of both fork 1 on the hindwing and 'barb-like projections' on the lateral processes of tergum X. The lateral processes of tergum X have a distinctive dorsal branch.

*Description.* Head pale yellow with brown triangular area between ocelli, body brown, wings dark brown; length of forewing: male 3.7–4.7 mm, female 4.2–5.0 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, long, length about 3.0 times width, slightly narrowed but not angled strongly near middle of ventral margin, with small digitiform process apically (Fig. 17); mesal process of tergum X broad (Fig. 19), simple in lateral view (Fig. 17); lateral processes of tergum X with dorsal branch joined basally, ventral branch about as long as inferior appendages, slightly laterally flattened, without 'barb-like projections', dorsal branch slightly shorter and more slender (Figs 17, 19); phallus robust with long endothecal spine embedded subapically (Figs 18, 19).

Female. Female genitalia relatively long, elongate; sternum VII with keel-like process. Posterolateral margin of segment VIII with dark sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior



margin of segment VIII fairly straight and without small notch. Segment VIII dorsally with a membranous area almost dividing segment. Ninth sternum without any pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively long, pigmented apical eereus (Figs 84, 85).

*Etymology.* *Orumbera* – Australian Aboriginal word for large spear (genitalia).

*Remarks.* *Chimarra orumbera* is known only from the Kimberley region of northern Western Australia (latitudinal range 14°25'–17°01'S).

*Chimarra pillara* sp. nov.

Figures 20–22, 92, 93

*Chimarra* sp. nov. T.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia, 'The Crusher' CALM site 9/1, 4 km S by W mining camp, Mitchell Plateau, 14°52'S, 125°50'E, 2–6 Jun 1988, I.D. Naumann (ANIC). Paratypes. Western Australia, 4 males, 10 km W by N of mining camp, Mitchell Plateau, 14°45'S, 125°47'E, at light, 11 May 1983, J.C. Cardale (ANIC); 4 males, 1 female, nr Mitchell Plateau airfield, 14°48'S, 125°49'E, at light, 15 May 1983, J.C. Cardale (ANIC); 1 male (specimen CT-288 figured), 1 female (specimen CT-327 figured) 'Marun' CALM site 8/4, Prince Frederick Harbour, 15°00'S, 125°21'E, at light, 6–11 Jun 1988, I.D. Naumann (ANIC); 1 male, 1 female, Mining camp, Mitchell Plateau, 14°49'S, 125°50'E, 9–19 May 1983, I.D. Naumann and J.C. Cardale (ANIC); 1 male, 2 females, 4 km S by W mining camp, Mitchell Plateau, at light, 14°52'S, 125°50'E, 13 May 1983, J.C. Cardale (ANIC); 1 male, 'The Crusher' CALM site 9/1, 4 km S by W mining camp, Mitchell Plateau, 14°52'S, 125°50'E, 2–6 Jun 1988, I.D. Naumann (ANIC); 1 male, Augustus Island, CALM site 26/1, 15°25'S, 124°38'E, 11–16 Jun 1988, I.D. Naumann (ANIC); 3 males, 1 female, CALM site 25/1, Synnot Ck, 16°31'S, 125°16'E, 17–20 Jun 1988, T.A. Weir (ANIC).

*Other material examined.* Northern Territory, 1 male, 8 females (specimen CT-327 figured), Litchfield Park, MV light, 3 Apr 1991, J. Webber and R. De Jong (NTM); 1 male, 7 females, Litchfield National Park, UV light, 6 Jun 1991, Wells and Webber (NTM).

*Diagnosis.* This species is distinguished from others in the group by the combination of relatively short paired mesal processes on tergum X and the lateral processes of tergum X with subapical 'barb-like projections' and well developed apical hook.

*Description.* Head, body and wings pale; length of forewing: male 4.6–5.2 mm, female 5.2–5.6 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 1, 2, 3 and 5

present: in forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, long, length about 3.5 times width, not angled strongly near middle of ventral margin, with small digitiform process apically (Figs 20, 21); pair of mesal processes of tergum X short (Fig. 22), simple in lateral view (Fig. 20); lateral processes of tergum X longer than inferior appendages, slightly laterally flattened, with relatively large 'barb-like projection' subapically and large apical hook (Figs 20, 22); phallus long with pair of robust endotheal spines visible dorsally (Figs 20, 22).

Female. Female genitalia relatively long, elongate; sternum VII with a keel-like process. Posterolateral margin of segment VIII with dark selerites and associated setae dorsally, near middle and ventrally. Ventral pair of selerites relatively narrowly separated, with connecting posterior margin of segment VIII with small notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum without any pigmented areas, posterior margin with angular 'corners'. Tergum X forming 2 lobes with numerous setae, each with relatively long, pigmented apical eereus (Figs 92, 93).

*Etymology.* *Pillara* – Aboriginal word for spear with two barbs (lateral processes on tergum X).

*Remarks.* This species is known from the Kimberley region of northern Western Australia and Litchfield National Park in the Northern Territory (latitudinal range 14°45'–16°31'S). It has been collected from April to June.

*Chimarra yandala* sp. nov.

Figures 23–25, 90, 91

*Chimarra* sp. n. G.—Wells and Cartwright, 1993: 227.

*Chimarra* sp. nov. CT-271.—Cartwright, 1997: 17.

*Type material.* Holotype male, Queensland, Gordon Ck, Iron Range, 16 Apr 1975, Moulds (NMV, T-17676). Paratypes. 1 male (specimen CT-271 figured) same locality, 10 Jun 1975, MSM (NMV); 2 males, 3 females, same locality, 12 May 1975, MSM (NMV); 1 male, 1 female (specimen CT-301 figured), same locality, 18 Apr 1975, Moulds (NMV); 2 females, Gordon Ck, Iron Range, 2 Jun 1975, MSM (NMV).

*Other material examined.* Queensland, 1 male, 1 female, Burster Ck, 10°55'S, 142°40'E, at light, 17 Oct 1992, P. Zborowski and T. Weir (ANIC); 1 male, Canal Ck u/s jn Eliot Ck, UV lt, 11°23'S, 142°25'E, 6 Feb 1992, Cartwright and Wells (QM); 2 females, Canal Ck u/s jn Eliot Ck, UV lt, 11°23'S, 142°25'E, 6 Feb 1992,

Cartwright and Wells (QM); 1 female, Dulhenty R., Telegraph Crossing, 11°50'S, 142°30'E, 10 Feb 1992, Cartwright and Wells (QM); 1 male, 14 km ENE Heathlands, by hand, rainforest, 11°41'S, 142°42'E, 28 Feb 1993, P. Zborowski (ANIC); 1 male, Dividing Range, 25 km W of Capt Billy Landing, 11°40'S, 142°45'E, 4–9 Jul 1975, G.R. Monteith (ANIC); 1 male, 9 km ENE Mt Tozer, MV It, 12°43'S, 143°17'E, 5–10 Jul 1986, J.C. Cardale (ANIC); 1 male, 2 females, Middle Claudie R., Iron Range, 2–9 Oct 1974, Moulds; 1 male, Archer R. crossing, Cape York Peninsula, 9 Sep 1974, MSM; 4 males, 3 km NE Mt Webb, 15°03'S, 145°09'E, 1–3 Oct 1980, J.C. Cardale (ANIC); 1 male, 7 km N of Hopevale Mission, 15°14'S, 145°07'E, 4 Oct 1980, J.C. Cardale (ANIC); 5 males, 1 km N of Rounded Hill nr Hopevale Mission, 15°17'S, 145°13'E, 5–6 Oct 1980, J.C. Cardale (ANIC); 1 male, 5 km W by N of Rounded Hill nr Hopevale Mission, 15°17'S, 145°10'E, 7 Oct 1980, J.C. Cardale (ANIC); 1 male, same locality, 15°17'S, 145°10'E, 7 Oct 1980, D.H. Colless (ANIC); 3 males, Mt Cook National Park, Cooktown, 15°29'S, 145°16'E, 11–12 Oct 1980, J.C. Cardale (ANIC).

**Diagnosis.** *Chimarra yandala* is distinguished from others in the group by the combination of paired mesal processes on tergum X and the elongate and slender lateral processes of tergum X with one subapical 'barb-like projection'.

**Description.** Head pale with brown triangular area between ocelli, body and wings brownish; length of forewing: male 5.0–5.4 mm, female 4.9–6.2 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 1, 2, 3 and 5 present; in forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, long, length about 3.5 times width, not angled strongly near middle of ventral margin, with small digitiform process apically (Figs 23, 25); pair of mesal processes of tergum X relatively long (Fig. 25), simple in lateral view (Fig. 23); lateral processes of tergum X longer than inferior appendages, slender, with 1 relatively small 'barb-like projection' subapically (Figs 24, 25); phallus with short, robust endotheal spine visible on dorsal margin subapically (Figs 23, 25).

Female. Female genitalia relatively long, elongate; sternum VII with elongate keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII with small notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum without pigmented areas, posterior margin with rounded 'corners'. Tergum X forming 2 lobes with numerous setae,

each with relatively long, pigmented apical cercus (Figs 90, 91).

**Etymology.** *Yandala* – Queensland Aboriginal word for spear with long point (lateral processes on tergum X).

**Remarks.** This appears to be a common species on Cape York Peninsula, north-eastern Queensland (latitudinal range 10°55'–15°29'S).

### *Chimarra natalicia*-group

The *C. natalicia*-group of two species, *C. natalicia* and *C. neboissi*, both characterised primarily by male genitalia with ventral process on segment IX which is relatively elongate and acute. Other common but not exclusive characters are dark head, body and wings, wings unicolorous, forewing with vein Rs thickened and curved slightly basal to discoidal cell, male genitalia with tergum X without any apparent mesal processes but with short, broad lateral processes, phallus with more than one endotheal spine, inferior appendages short; female genitalia relatively short and broad. Both members of this group are from north-east Queensland.

### *Chimarra natalicia* sp. nov.

Figures 26–28, 104, 105

*Chimarra* sp. nov. CT-221.—Walker et al., 1995: 26.—Cartwright, 1997: 17.

**Type material.** Holotype male, Queensland, Birthday Ck, 3.5 km WNN Paluma, 18°59'S, 146°10'E, at light, 8 Oct 1989, R. St Clair (NMV, T-17688). Paratypes, 14 males, 16 females (specimen CT-309 figured), collected with holotype (NMV); 1 male (specimen CT-221 figured), same locality, 1 Apr 1990, R. St Clair (NMV); 2 males, same locality, 17 Mar 1990, R. St Clair (NMV).

**Other material examined.** Queensland, 1 male, 1 female, Windsor Tableland, 20 Feb 1982, MSM; 2 males, 5 females, Upper Freshwater Ck, Whitfield Range nr Cairns, 15 Dec 1974, Moulds; 1 male, Upper Freshwater Ck, Whitfield Range nr Cairns, MV-light, 24 Aug 1974, Moulds; 1 male, 1.5 km SE Kuranda, 16–17 May 1980, I.D. Naumann and J. Cardale (ANIC); 4 males, Bellenden Ker Range, Cableway Base Stn, 100 m, 1–7 Nov 1981, Earthwatch/Qld Museum; 1 male, 1 female, Bellenden Ker Range, Cableway Base Stn, 100 m, 17–24 Oct 1981, Earthwatch/Qld Museum; 1 male, Koolmoon Ck, Atherton Tablelands, site KM 1, 27 Nov 1990, S. Bunn and M. Gray; 1 male, Tully Falls, S of Ravenshoe, 11 Jan 1977, M.S. and B.J. Moulds; 2 males, 1 female, Birthday Ck, 3.5 km WNN Paluma, 18°59'S, 146°10'E, at light, 17 Feb 1990, R. St Clair; 1 female, Paluma, 27 Jan 1982, MSM; 1 female, Birthday Ck below falls, Mt Spec State



Forest, 18°57'S, 146°10'E, 760 m, lt. tr., 17 Mar 1994, A.L. Sheldon; 2 males, 4 females, same site, 29 Mar 1994; 7 females, Echo Ck tributary, Mt Spec State Forest, 18°57'S, 146°10'E, 735 m, lt. tr., 7 Nov 1993, A.L. Sheldon; 1 female, Echo Ck, Mt Spec State Forest, 18°57'S, 146°10'E, 735 m, lt. tr., 5 Mar 1994, A.L. Sheldon; 1 female, Echo Ck, Mt Spec State Forest, 18°57'S, 146°10'E, 700 m, lt. tr., 17 May 1994, A.L. Sheldon; 1 female, Running River, Mt Spec State Forest, 18°57'S, 146°10'E, 640 m, lt. tr., 16 Mar 1994, A.L. Sheldon.

**Diagnosis.** Males of this species resemble those of *C. nevoissi* having the ventral process on segment IX relatively elongate, acute, projecting between bases of inferior appendages, but differ in that the apices of the inferior appendages are turned mesally and extended into a digitiform process, which is narrowly separated from the subapical angle, forming a deep notch.

**Description.** Head brown, body and wings light brown; length of forewing: male 4.8–5.4 mm, female 5.7–6.4 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

**Male.** Ventral process on segment IX relatively elongate, acute, projecting between bases of inferior appendages (Figs 26, 27); inferior appendages in lateral view, very short, robust, length about 1.2 times width (Fig. 26), in ventral view stout, with apices turned mesally and extended into a digitiform process, which is narrowly separated from the subapical angle, forming a deep notch (Fig. 27); mesal processes of tergum X not apparent, lateral processes of tergum X robust, inflected apically; phallus robust with many small endothecal spines embedded subapically (Figs 26–28).

**Female.** Female genitalia relatively short, broad; sternum VII with a keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII with a large notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with 2 lightly pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 104, 105).

**Etymology.** *Natalicia* – Latin word for birthday (type locality Birthday Creek).

**Remarks.** *Chimarra natalicia* is a common north eastern Queensland species (latitudinal range 16°10'–19°00'S).

### *Chimarra nevoissi* sp. nov.

Figures 29–31, 108, 109

*Chimarra* sp. nov. CT-223.—Walker et al., 1995: 26.—Cartwright, 1997: 17.

**Type material.** Holotype male, Queensland, Little Mulgrave R., 9 km SW of Gordonvale, 17 Nov 1979, A.N. (NMV, T-17722). Paratypes. 7 males (specimen CT-223 figured), 5 females (specimen CT-324 figured), collected with holotype (NMV).

**Other material examined.** Queensland. Mt Webb National Park, Hopevale Mission, Cooktown area, Whitfield Range nr Cairns, Mareeba district, nr Gordonvale, NW of Tully, Kirrama State Forest, Mt Spec State Forest (ANIC, NMV).

**Diagnosis.** Males of *Chimarra nevoissi* resemble those of *C. natalicia* having the ventral process on segment IX relatively elongate, acute, projecting between bases of inferior appendages, but differ in that the apices of the inferior appendages are separated widely from the basal angle, forming a wide notch. The wing venation in some specimens appears variable in that fork 1 in the hindwing is sometimes missing or not apparent.

**Description.** Head, body and wings dark brown to blackish; length of forewing: male 4.5–5.3 mm, female 5.1–5.9 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 1, 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

**Male.** Ventral process on segment IX relatively elongate, acute, projecting between bases of inferior appendages (Figs 29, 30); inferior appendages in lateral view, short, tapering slightly apically, length about twice width (Fig. 29), in ventral view stout, with apices separated widely from basal angle, forming a wide notch (Fig. 30); mesal processes of tergum X not apparent, lateral processes of tergum X short, robust, situated below phallus; phallus robust with two long slender endothecal spines embedded subapically (Figs 29–31).

**Female.** Female genitalia relatively short, broad; sternum VII with a small keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites joined forming a central 'T-shaped' pigmented area. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum without any lightly pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 108, 109).

*Etymology.* *Neboissi* – named after Dr Arturs Neboiss (collector).

*Remarks.* *Chimarra nevoissi* is a common dark species known from north-eastern Queensland (latitudinal range 15°04'–18°57'S). Superficially *C. nevoissi* males can be confused with another very common north-eastern Queensland dark species, *C. karakara*, but the species can be distinguished by the length of the ventral process on segment IX.

### *Chimarra uranka*-group

The *C. uranka*-group of two species, *C. uranka* and *C. ranuka*, is characterised primarily by male genitalia with phallus with large dorsal phallic projection or 'apicodorsal extension of the phallosome'. Other common but not exclusive characters are brownish body and wings, wings unicolorous, forewing with vein Rs thickened basal to discoidal cell, in males tergum X with pair of mesal processes, phallus with one apical spine, inferior appendages in lateral view, broadbased and tapered apically, ventral process on segment IX small and keel-like. Both are from northern Australia.

### *Chimarra uranka* Mosely

Figures 32–34, 94, 95

*Chimarra uranka* Mosely in Mosely and Kimmins, 1953: 399, fig. 273.—Neboiss, 1986: 106.

*Type material.* Holotype male, Queensland, Kuranda, 1100 ft, 21 Jun–24 Jul 1913, R. E. Turner (BMNH). Type not seen.

*Material examined.* Queensland. 1 male (specimen CT-290 figured), 1 female (specimen CT-293 figured), trib. Bertie Ck. 250 m SW Heathlands H.S., 11 Feb 1992, Cartwright and Wells (QM); Cape York Peninsula, Cairns and Townsville areas, near Monto, Goomeri and Benarkin.

Northern Territory. Cape Crawford, Arnhemland, Kakadu, Litchfield and Katherine Gorge National Parks, Victoria River Downs.

Western Australia. Kimberley-Mitchell Plateau, Lake Argyle area, Bungle Bungle National Park, near Halls Creek, Giekie Gorge and Tunnel Ck.

*Diagnosis.* *Chimarra uranka* most closely resembles *C. ranuka* from which it is distinguished by the relatively short pair of mesal processes of tergum X and the dorsoventrally flattened apex of the dorsal phallic projection.

*Description.* Head orange-yellow, body and wings dark brownish; length of forewing: male 4.2–6.0 mm, female 4.4–7.0 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present; hind-

wing with forks 2, 3 and 5 present. In forewing, vein Rs thickened slightly basal to discoidal cell.

*Male.* (Revised after Mosely in Mosely and Kimmins, 1953). Ventral process on segment IX small, keel-like; inferior appendages in lateral view, relatively robust, tapering slightly apically, length about twice width, upturned (Fig. 32), in ventral view, directed slightly distally (Fig. 33); pair of mesal processes of tergum X relatively short (Fig. 34), pair of lateral processes of tergum X short, robust (Figs 33, 34); phallus robust with single, short, upturned endotheal spine visible apically, dorsally with single, slightly dorsoventrally flattened elongate dorsal phallic projection, with simple apex (Figs 32, 32a, 34).

*Female.* Female genitalia relatively short, broad; sternum VII with keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with 2 triangular lightly pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cereus (Figs 94, 95).

*Remarks.* *Chimarra uranka* is an extremely common and widespread species throughout northern Australia (latitudinal range 10°48'–26°53'S). Mosely's, (in Mosely and Kimmins, 1953) figures have been redrawn to allow direct comparisons and to accompany the description that is revised in light of new interpretations of *Chimarra* genital structures.

### *Chimarra ranuka* sp. nov.

Figures 35–37

*Type material.* Holotype male, Northern Territory, Litchfield National Park, UV light, 6 Jun 1991, Wells and Webber (NMV, T-17735). Paratypes. 2 males (specimen CT-291 figured), collected with holotype (NMV); 2 males, same locality, 3 Apr 1991, J. Webber and R. de Jong (NTM).

*Diagnosis.* This species most closely resembles *C. uranka* from which it is distinguished by the relatively long pair of mesal processes of tergum X and the concave apex of the dorsal phallic projection.

*Description.* Head, body and wings brownish; length of forewing: male 4.3–5.1 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In



forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, relatively slender, tapering slightly apically, length about 3.0 times width, upturned (Fig. 35), in ventral view, directed slightly distally (Fig. 36); pair of mesal processes of tergum X long, slender (Fig. 37), pair of lateral processes of tergum X robust, apices slightly turned outwards (Figs 35–37); phallus robust with single endotheal spine embedded apically, dorsally with single, slender, elongate phallic projection with concave apex (Figs 35, 35a, 37).

Female unknown.

*Etymology.* *Ranuka* – anagram of uranka.

*Remarks.* *Chimarra ranuka* appears to be restricted in distribution and probably is rare as it has been collected from the type locality only (latitude 13°28'S).

#### *Chimarra tallawalla*-group

The *Chimarra tallawalla*-group of two species, *C. tallawalla* and *C. wooroonoonan*, characterised primarily by male genitalia with phallus with long phallic (or endotheal) spines. Other non-exclusive characters are dark head, body and wings, wings unicolorous, forewing with vein Rs not thickened and straight basal to discoidal cell, in males tergum X with at most a small pair of mesal or lateral processes, inferior appendages in lateral view, slender and upturned, ventral process on segment IX small and keel-like. Both are from eastern Australia.

#### *Chimarra tallawalla* sp. nov.

Figures 38–40, 106, 107

*Chimarra* sp. nov. CT-224.—Cartwright, 1997: 17.

*Type material.* Holotype male, New South Wales, Cangi Ck, NW of Grafton, 29°34'S, 152°26'E, 15 Jan 1985, G. Theischinger (NMV, T-17738). Paratypes. 15 males (specimen CT-224 figured), 18 females (specimen CT-304 figured), collected with holotype (NMV).

*Other material examined.* Queensland, 1 male pupa, Nerang R., nr Advancetown, 8 Feb 1973, collector?; 1 male, Mt Superbus, 22 Jan 1971, S.R. Monteith (ANIC); 5 males, 2 females, Wallangarra, Qld-NSW border, 31 Dec 1956, J.K. New South Wales, 1 female, Korumbyn Ck, 28°24'S, 153°19'E, E slope of Mt Warning, 29 Jul 1988, AN; 2 females, Undercliffe Falls, 25 km E of Stanthorpe, 11 Oct. 1973, AN; 17 males, 20 females, Clarence R. at Yates Crossing, 26 Oct 1981, Wells and Carter; 34 males, 20 females, Cangi Ck, NW of Grafton, 29°34'S, 152°26'E, 15 Jan

1985, Theischinger; 17 males, 19 females, Boyd R., 5 km E of Dalnert on old Grafton Rd, 27 Oct 1981, Wells and Carter; 1 male, Fernbrook nr Dorriggo, 17 Dec 1975, A.B. Prose?; 2 males, Bellinger R., 30°26'S, 152°44'E, 31 Oct 1981, Wells and Carter; 6 males, Styx R., 12 km S of Ebor, 17 Oct 1973, AN; 12 males, 18 females, Styx R. at Forest Camp in Styx River State Forest, 28 Oct 1981, Wells and Carter; 3 males, Apsley R. at falls, SE of Walcha, 29 Oct 1981, Wells and Carter; 8 males, 41 females, Wilson R., NW of Wauchope, 31°14'S, 152°34'E, 30 Oct 1981, Wells and Carter; 1 male, 8 females, Duffers Ck, 9 km WSW Barrington, 16 Feb 1980, A. Calder; 33 males, 55 females, Gloucester R., 9 km SW of Gloucester, 17 Feb 1980, A. Calder; 2 females, U. Allyn R., 12 km N of Eccleston, 21 Feb 1980, A. Calder; 2 males, 3 females, 'Tuglo' 48 km N of Singleton, 3 Feb 1979, Smithers; 2 males, 6 females, 'Tuglo' 48 km N of Singleton, alt. 780m, 5 Oct 1975, MSM; 34 males, 58 females, Allyn R., NE of Eccleston, 3 Nov 1981, Wells and Carter; 3 males, 32 females, Allyn R. nr Allynbrook, 21 Mar 1973, AN; 2 male pupae, Tuross R., 3 Feb 1977, J. Dean.

*Diagnosis.* Males of *Chimarra tallawalla* resemble those of *C. wooroonoonan*, but differ in having the phallus with paired, very slender, very elongate phallic (or endotheal) spines dorsally, attached near base of phallosome, often extending past apex of phallus.

*Description.* Head, body and wings brown; length of forewing: male 5.1–6.3 mm, female 5.4–7.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, short, slender, length about 4.0 times width, upturned slightly (Fig. 38), in ventral view, short, broadbased (Fig. 39); mesal processes of tergum X not apparent (Fig. 40), pair of lateral processes of tergum X short, robust, situated below phallus (Figs 38, 39); phallus relatively slender with pair of very slender, very elongate phallic (or endotheal) spines dorsally, attached near base of phallosome (Figs 38–40, 38a), although sometimes withdrawn and so not as apparent (Figs 38b, 40a).

Female. Female genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with sclerites near middle and groups of setae ventrally. Ventrally posterior margin of segment VIII straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with 2 pockets laterally. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 106, 107).

*Etymology.* *Tallawalla* – NSW Aboriginal word for forest country (habitat).

*Remarks.* *Chimarra tallawalla* is a common but distinctive species found in eastern New South Wales and southeastern Queensland (latitudinal range 28°02'–36°06'S).

*Chimarra wooroonooran* sp. nov.

Figures 41–43, 110, 111

*Chimarra* sp. nov. CT-228.—Walker et al., 1995: 26.—Cartwright, 1997: 17.

*Type material.* Holotype male (specimen CT-228 figured), Queensland, Bellenden Ker Range, 0.5 km S Cable Tower No. 7, 500m, 25–31 Oct 1981, Earthwatch/Qld Museum (NMV, T-17904). Paratype, 1 female, collected with holotype (specimen CT-314 figured, NMV).

*Diagnosis.* This species differs from *C. tallawalla* in having the phallus with paired slender, long phallie (or endotheal) spines laterally, attached near base of endothea, never extending past apex of phallus.

*Description.* Head, body and wings brown; length of forewing: male 4.2 mm, female 5.0 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs not thickened but curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, slender, length about 3.0 times width, upturned, tapering slightly apically (Fig. 41), in ventral view, broadbased, apices turned slightly mesally (Fig. 42); pair of short mesal processes of tergum X pale, not obvious, lateral processes of tergum X not apparent; phallus robust, with pair of long and slender phallic (or endotheal) spines embedded laterally, apices turned slightly outwards, and with about 5 small dark endotheal spines embedded subapically (Figs 41–43, 41a).

Female. Genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally and near middle. Ventroposterior margin of segment VIII with a number of long setae, relatively straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum without any apparent pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cereus (Figs 110, 111).

*Etymology.* *Wooroonooran* – Queensland Aboriginal word for Bellenden Ker Range (type locality).

*Remarks.* *Chimarra wooroonooran* is known from only one male and one female specimen from the type locality only in northeastern Queensland (latitude 17°16'S).

*Chimarra adaluma*-group

The *C. adaluma*-group of five species, *C. adaluma*, *C. yoolumba*, *C. nabilla*, *C. akrina* and *C. pita*, is characterised primarily by males with tergum X and/or IX with one or two pairs of slender and elongate mesal processes, and phallus with a dorsal sclerotised 'hood-like' projection. Other common but not exclusive characters are body and wings brownish, wings unicolorous, forewing, with vein Rs thickened and curved slightly basal to discoidal cell, inferior appendages in lateral view, broadbased and upturned apically, phallus with strong ventral endotheal spine or ventral process, ventral process on segment IX small and keel-like. All members of this group are from northwestern Australia (N-WA and N-NT).

*Chimarra adaluma* sp. nov.

Figures 44–46

*Chimarra* sp. nov. CT-268.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia, Kimberley, Prince Regent R., King Cascade, MV It. 27 Jul 1990, D.K. Yeates (NMV, T-17773). Paratypes, 14 males (specimen CT-268 figured), collected with holotype (NMV).

*Other material examined.* Western Australia, 22 males, CALM site 28/3, 4 km W of King Cascade, 15°35'S, 128°15'E, 17–20 Jun 1988, T.A. Weir (ANIC).

*Diagnosis.* *Chimarra adaluma* is distinguished from others in the group by the 1 pair of curved spine-like mesal processes of tergum X and the lateral pair of processes of tergum X with apices almost meeting ventral to the phallus.

*Description.* Head pale, body and wings light brown; length of forewing: male 4.8–5.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, robust, subquadrate, length about 1.1 times width (Fig. 44), in ventral view, length about 2.5 times width, with apices directed slightly mesally (Fig. 45); pair of mesal processes of tergum X or IX slender, curved (Fig. 46), pair of lateral processes of tergum X project below phallus; phallus



relatively robust with single, slender, ventral endotheal spine and dorsal sclerotised slightly flanged 'hood-like' projection (Figs 44–46).

Female unknown.

*Etymology.* *Adaluma* – Australian Aboriginal word for river (habitat).

*Remarks.* *Chimarra adaluma* has been found at only two sites in the Kimberley region of north Western Australia (latitudinal range 15°35'–15°38'S).

*Chimarra yoolumba* sp. nov.

Figures 47–49, 100, 101

*Chimarra* sp. nov. CT-264.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia, Fortescue Falls, Hamersley Range National Park, 27 Oct 1979, J. B. (NMV, T-17788). Paratypes. 5 males (specimen CT-264 figured), 5 females (specimen CT-265 figured), collected with holotype (NMV).

*Other material examined.* Western Australia. 3 males, Hamersley National Park, Fortescue Falls, 23°38'S, 118°33'E, 23 Apr 1992, Cranston and Gullan (ANIC).

*Diagnosis.* This species most closely resembles *C. nabilla* in general form of male genitalie structures, but is distinguished by having the inner pair of mesal processes of tergum X relatively widely separated, situated adjacent to outer pair.

*Description.* Head pale brown, body and wings brownish; length of forewing: male 5.3–5.7 mm, female 6.6–7.1 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, robust, length about twice width, upturned slightly (Fig. 47), with apices turned slightly mesally and extended into a digitiform process (Fig. 49), in ventral view, length about twice width (Fig. 48); 2 pairs of dark mesal processes of tergum X, slender, straight, of similar length, individual process of each pair widely separated, but inner and outer processes adjacent (Fig. 49), lateral processes of tergum X not apparent; phallus relatively robust, with ring of about 6 dark, stout endotheal spines subapically and dorsal sclerotised 'hood-like' projection (Figs 47, 48).

Female. Female genitalia relatively short, broad; sternum VII with keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and

ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum without any lightly pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 100, 101).

*Etymology.* *Yoolumba* – Western Australian Aboriginal word for the Fortescue River (type locality).

*Remarks.* This species is known from the type locality only in the Pilbara region, north Western Australia (latitude 23°38'S).

*Chimarra nabilla* sp. nov.

Figures 50–52, 102, 103

*Chimarra* sp. nov. CT-267.—Cartwright, 1997: 17.

*Type material.* Holotype male, Western Australia, Kimberley, Prince Regent River, King Cascade, MV light, 27 Jul 1990, D.K. Yeates (NMV, T-17799). Paratypes. Western Australia. 3 males (specimen CT-267 figured), collected with holotype (NMV); 1 male, Backsten Ck. S of Prince Regent Reserve, 16°00'S, 125°29'E, 6 Sep 1996, I. Edwards (NMV); 2 males, 2 females (specimen CT-325 figured), Mitchell Plateau, Lone Dingo Ck. trib. of Mitchell R., 17 Feb 1979, J.E.B. (NMV); 3 males, 'The crusher', CALM site 9/1, 4 km S by W mining camp, Mitchell Plateau, 14°52'S, 125°50'E, at light, 2–6 Jun 1988, I. D. Naumann (ANIC).

*Other material examined.* Northern Territory. 29 males, 42 females, Berry Springs, MV light, 26 Jun 1991, Wells and Webber (NTM); 4 males, Berry Springs, 12°42'S, 130°58'E, 7 May 1992, Wells (NTM). Western Australia. 3 males, nr Mitchell Plateau airfield, 14°48'S, 125°49'E, at light, 15 May 1983, J.C. Cardale (ANIC).

*Diagnosis.* *Chimarra nabilla* most closely resembles *C. yoolumba* in general form of male genitalie structures, but is distinguished by having two pairs of dark, relatively stout mesal processes of tergum X, inner pair of processes adjacent and slightly shorter than outer pair which are situated slightly ventrally with respect to inner pair.

*Description.* Head pale with brownish triangular area anterior to ocelli, body and wings brownish; length of forewing: male 4.0–5.2 mm, female 4.6–6.0 mm; wing venation: forewing with forks 1, 2, 3 and 5; hindwing with forks 2, 3 and 5. In forewing, discoidal cell with distal veins thickened and Rs thickened and slightly sinusoidal distal to discoidal cell.

Male. Ventral process on segment IX small,

keel-like; inferior appendages in lateral view, robust, length about 1.5 times width, upturned slightly (Fig. 50), with apices turned slightly mesally and extended into digitiform process (Fig. 52), in ventral view, length about 2.5 times width (Fig. 51); 2 pairs of dark mesal processes of tergum X, relatively stout, slightly curved, inner pair of processes adjacent and slightly shorter than outer pair (Fig. 52), which are situated slightly ventrally with respect to inner pair (Fig. 50), lateral processes of tergum X not apparent; phallus relatively robust with ring of about 5 dark, stout endotheal spines subapically and 1 apically and with pale dorsal sclerotised 'hood-like' projection (Figs 50–52).

**Female.** Female genitalia relatively short, broad; sternum VII with keel-like process. Posterolateral margin of segment VIII with selerites and associated setae dorsally, near middle and ventrally. Ventral pair of selerites relatively narrowly separated, with connecting posterior margin of segment VIII relatively straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum without any lightly pigmented areas. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cecus (Figs 102, 103).

**Etymology.** *Nabilla* – Australian Aboriginal word for water.

**Remarks.** *Chimarra nabilla* is a slightly variable species with male specimens from the Northern Territory differing from the type material, mainly in the positioning and angle of the spines on the phallus. Known from the Kimberley region of northern Western Australia and Berry Springs, northern Northern Territory (latitudinal range 12°42'–16°00'S).

***Chimarra akuma* sp. nov.**

Figures 53–55, 96, 97

*Chimarra* sp. B.—Wells, 1991: 20.

*Chimarra* sp. nov. CT-269.—Cartwright, 1997: 17.

**Type material.** Holotype male, Northern Territory, Radon Springs, It tr., 14 Apr 1989, AW and PS (NMV, T-17808). Paratypes, 13 males (specimen CT-294 figured), 6 females (specimen CT-295 figured), collected with holotype (NMV).

**Other material examined.** Northern Territory. 1 male, E. Alligator R. at Cahills Crossing, It tr., 27 May 1988, AW and PS; 5 males, 5 females (including 3 copulating pairs), ARRS Radon Springs, It tr., 13–14 Apr 1988, AW and PS; 4 males, 1 female, same locality, It tr., 14 Apr 1989, AW and PS; 4 males, 1 female, ARRS Radon Springs, It tr., 12°45'S, 132°55'E, 13–14 Apr 1989,

AW and PS; 2 males, ARRS Radon Springs, It tr., 12°45'S, 132°55'E, 13–14 Apr 1989, AW and PS; 7 males, 4 females, ARRS Radon Springs, It tr., 13–14 Apr 1988, AW and PS; 2 males, ARRS Radon Springs, It tr., 14 Apr 1989, AW and PS; 24 males, 27 females, ARRS Radon Springs, It tr., 18–19 May 1988, AW and PS; 3 males, Radon (Radon?) Ck, Kakadu National Park 3 Sep 1979, JB; 2 males, 1 female, ARRS Bowerbird Billabong outlet, 12°47'S, 132°02'E, 1 Oct 1988, PD; 1 male, ARRS Baroalpa Springs, 22 May 1988, AW and PS; many males, females, Baroalpa Springs, Kakadu National Park, UV, 12°48'S, 132°49'E, 16 Jan 1992, Wells (NTM); many males, females, same locality, 4 Mar 1992, Wells (NTM); 1 male, 1 female, Jin Jim Ck, 3 km below falls, Kakadu National Park, 1 Sep 1979, JB; 1 male, 2 females, Graveside Gorge, It trap, 18 Jul 1988, P.D.; 12 males, 8 females, ARRS Graveside Gorge, It trap, 18 Jul 1988, PD; 3 males, 7 females, Graveside Ck, It trap, 18 Jul 1988, PD; 4 males, 1 km below Twin Falls, Kakadu National Park, It tr., 30 Aug 1979, JB; 12 males, 5 females, ARRS ck 5 km W of OSS, 13°33'S, 132°34'E, 19 Apr 1989, AW and PS; 2 males, 1 female, ARRS Stag Ck at BHP camp, It tr., 25 May 1988, AW and PS; 1 male, ARRS S Alligator R. above Fisher Ck jn, It tr., 19–20 Apr 1989, AW and PS; 3 males, Devil Devil Ck, 70 km SW Daly R. Mission, 23 Aug 1979, JB.

**Diagnosis.** *Chimarra akuma* closely resembles *C. pita* in general form of male genitalie structures, but is distinguished by having 2 pairs of dark, long and slender mesal processes of tergum X, all of similar length, individual processes of inner pair adjacent, outer processes slightly more widely separated.

**Description.** Head pale with brownish triangular area anterior to ocelli, body and wings brownish; length of forewing: male 4.5–5.5 mm, female 4.9–5.7 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

**Male.** Ventral process on segment IX small, keel-like; inferior appendages in lateral view, robust, length about twice width, upturned and tapering slightly apically (Fig. 53), in ventral view, length about 2.5 times width (Fig. 54); 2 pairs of dark mesal processes of tergum X, slender, slightly curved, of similar length (Fig. 55), individual processes of inner pair adjacent, outer processes slightly more widely separated (Fig. 55), robust pair of lateral processes of tergum X situated below phallus (Figs 53–55); phallus relatively robust with broadbased process ventrally (Fig. 54) and dorsal sclerotised 'hood-like' projection (Figs 53, 54).

**Female.** Female genitalia relatively short, broad; sternum VII with keel-like process.



Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII relatively straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of poorly defined lightly pigmented subtriangular sclerites, their inner margins touching at base. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 96, 97).

*Etymology.* *Akruma* - anagram of uranka.

*Remarks.* *Chimarra akruma* is a common species throughout the Alligator Rivers region, northern Northern Territory (latitudinal range 12°26'–13°34'S).

### *Chimarra pita* sp. nov.

Figures 56–58, 98, 99

*Type material.* Holotype male, Mitchell Plateau, Camp Ck, lt tr., 13 Jul 1978, PS and M. Tyler (NMV, T-17828). Paratypes, 1 male, Mitchell Plateau, Camp Ck at crusher, UV lt, 15 Feb 1979, JEB (NMV); 1 male, Mitchell Plateau, Camp Ck at crusher, UV lt, 15 Feb 1979, JEB (NMV); 1 male, Mitchell Plateau, Kimberley, lt tr., 30 Jan 1978, JEB (NMV); 1 male, Mitchell Plateau, Camp Ck, UV lt tr., 20 Jul 1978, PS and M. Tyler (NMV); 1 male (specimen CT-269 figured), Prince Regent R., Kimberley, 15°47'S, 125°24'E, May 1985, E. Bloomfield (NMV); 1 female (specimen CT-326 figured), Kimberley, Prince Regent R., 15°47'S, 125°24'E, May 1985, E. Bloomfield (NMV).

*Other material examined.* Western Australia. 1 male, nr Mitchell Plateau airfield, 14°48'S, 125°49'E, at light, 15 May 1983, J.C. Cardale (ANIC); 1 male, 'Marun' CALM site 8/4, Prince Frederick Harbour, 15°00'S, 125°21'E, at light, 6–11 Jun 1988, I.D. Naumann (ANIC); 5 males, CALM site 28/3, 4 km W of King Caseade, 15°35'S, 128°15'E, 17–20 Jun 1988, T.A. Weir (ANIC). Northern Territory. 117 males, 1 female, Litchfield National Park, UV light, 6 Jun 1991, Wells and Webber (NTM); 4 males, 2 females, Litchfield Park, MV light, 3 Apr 1991, J. Webber and R. De Jong (NTM); 1 male, 1 female, Litchfield National Park, lagoon nr Tolmer Falls, UV lt, 24–25 Jun 1992, Wells and Webber (NTM); 4 males, 5 females, Litchfield National Park, billabong, UV, 18–19 Apr 1992, AW (NTM); 1 male, Litchfield National Park, Walker Ck, 18 Apr 1992, AW (NTM).

*Diagnosis.* *Chimarra pita* most closely resembles *C. akruma* in general form of male genitalic structures, but is distinguished by having two pairs of dark slender, mesal processes of tergum X, outer pair about half to two-thirds length of inner pair,

individual processes of inner pair adjacent, outer processes narrowly separated from inner processes.

*Description.* Head pale with brownish triangular area anterior to ocelli, body and wings brownish; length of forewing: male 4.0–4.8 mm, female 4.9–5.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, robust, length about twice width, upturned and tapering slightly apically (Fig. 56), in ventral view, length about 2.5 times width (Fig. 57); two pairs of dark mesal processes of tergum X, slender, slightly curved, outer pair about half to two-thirds length of inner pair, individual processes of inner pair adjacent, outer processes narrowly separated from inner processes (Fig. 58), pair of lateral processes of tergum X situated below phallus, relatively slender with slightly out turned apices (Figs 56–58); phallus relatively robust with broadbased process ventrally (Fig. 57) and dorsal sclerotised 'hood-like' projection (Figs 56, 58).

Female. Female genitalia relatively short, broad; sternum VII with short keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII slightly convex and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with poorly defined lightly pigmented areas. Tergum X forming 2 lobes with numerous setae, each with a relatively short apical cercus (Figs 98, 99).

*Etymology.* *Pita* – Australian Aboriginal word for four-pronged spear (four mesal processes on tergum X).

*Remarks.* *Chimarra pita* is found in the Kimberley region, north Western Australia, Litchfield Park, northern Northern Territory (latitudinal range 12°58'–15°47'S).

### *Chimarra monticola*-group

The *C. monticola*-group of three species, *C. monticola*, *C. australica* and *C. kewarra*, is characterised by not possessing any of the primary distinguishing characters of the previous groups, but with male genitalia with relatively slender upturned inferior appendages. Other common but not exclusive characters are dark head, body and

wings, wings unicolorous, phallus with several endotheal spines, ventral process on segment IX small and keel-like; females with pair of dark sub-triangular sclerites on ninth sternum. All members of this group are from eastern Australia.

*Chimarra monticola* Kimmins

Figures 59–61, 122, 123

*Chimarra monticola* Kimmins in Mosely and Kimmins, 1953: 402, fig. 275.—Neboiss, 1986: 105.—Cartwright, 1990: 19, fig. 16 (female).

*Type material.* Holotype male, New South Wales, Rules, Point, 4450 ft, 30 Dec 1934, R. J. Tillyard (BMNH). Type not seen.

*Material examined.* Tasmania. 1 male (PT-802). Great Lake, stream S of Breona, 27 Jan 1960, F. McDonald. Victoria. 1 male, (specimen CT-278 figured) O'Shannassy R., 12 Dec 1975, J. Dean and D. Cartwright; 1 female (specimen CT-322 figured). O'Shannassy R.—Yarra R. jn, 1 Dec 1977, J. Dean and D. Cartwright; Otway Ranges, Yarra River system, Mitta Mitta River system, north-east, East Gippsland, New South Wales. South-east, north-east. List of localities available from author.

*Diagnosis.* Resembling *C. australica* and *C. kewarra* in general form of male genitalia, but the form of the lateral processes on tergum X, with a pair of short, broadbased ventrolateral processes, is quite distinct from the hooked processes in those species.

*Description.* Head, body and wings black; length of forewing: male 6.0–7.3 mm, female 7.3–8.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs not thickened or curved basal to discoidal cell.

Male. (Revised after Kimmins in Mosely and Kimmins, 1953). Ventral process on segment IX small, keel-like; inferior appendages in lateral view, length about 3.0 times width, upturned, tapering slightly apically (Fig. 59), in ventral view, broadbased, apices turned slightly mesally (Fig. 60); no mesal processes of tergum X apparent, pair of lateral processes of tergum X short, broadbased; phallus relatively long, slender, with about 4 endotheal spines embedded subapically (Figs 59–61).

Female. (Revised after Cartwright, 1990). Female genitalia relatively short, broad; sternum VII with weak keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of

segment VIII relatively straight and without notch. Segment VIII dorsally with a membranous area almost dividing segment. Ninth sternum with pair of darkly pigmented triangular sclerites, length less than width, their inner margins touching at base. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 122, 123).

*Remarks.* *Chimarra monticola* is a common and widespread species throughout eastern NSW and Victoria, including one male specimen from central Tasmania (latitudinal range 21°02'–41°47'S). According to Neboiss (pers. comm.) the Tasmanian male (PT-802) is a close but distinct species. Kimmins' (in Mosely and Kimmins, 1953) and Cartwright's, (1990) figures have been redrawn to allow direct comparisons and to accompany the description that is revised in light of new interpretations of *Chimarra* genitalic structures.

*Chimarra australica* Ulmer

Figures 62–64, 118, 119

*Chimarra australica* Ulmer, 1916: 3–5, figs 3–6.—Mosely and Kimmins, 1953: 399, fig. 274.—Neboiss, 1986: 105.—Cartwright, 1990: 20, fig. 18 (female).

*Type material.* Holotype male, Queensland, Malanda, date and collector unknown (NRS). Type not seen.

*Material examined.* Queensland. 1 female, Zarda Ck nr Mt Misery, W of Mossman, 1200m, 23 Dec 1974, MSM; 1 male (CT-275), 25 km along Mt Lewis Rd, SW of Mossman, 16 Jan 1977, M.S. and B.J. Moulds; 1 male, Rocky Ck, 11 km N of Atherton, 3 May 1967, D.H. Colless (ANIC); 1 male (CT-276), Bellenden Ker Range, Cableway Base Station, 100m, 17–24 Oct 1981, Earthwatch/Qld Museum; 1 male (specimen CT-309 partly figured), Mt Spec State Forest, Birthday Ck above weir, 18°57'S, 146°10'E, It tr., 13 Nov 1993, A.L. Sheldon; 2 males, 1 female, same site, 6 Dec 1993, A.L. Sheldon; 1 male, 1 female?, same site, 15 Oct 1993, A.L. Sheldon; 1 male, same locality, 6 Nov 1993; 1 male (specimen CT-292 partly figured), Finch Hatten Gorge, 21°07'S, 148°38'E, 14 Nov 1982, Theischinger; 1 female, (specimen CT-323 figured); 1 male, Mt Nebo area, slow stream at roadside, 1 May 1975, coll.? (ANIC); New South Wales. North-east, central east and south-east; 1 male (specimen CT-277 partly figured), Brogo River, 22 Jan 1977, J. Dean?. Victoria. East Gippsland, north-east, Yarra River system, Lal Lal Falls, near Lorne. List of other localities available from author.

*Diagnosis.* This species most closely resembles *C. kewarra* in general form of male genitalic structures, but is distinguished by having lateral processes of tergum X, with relatively short,



upturned or out turned apices. The phallus has a distinctive ventral process.

**Description.** Head, body and wings black to brownish-black; length of forewing: male 4.7–5.9 mm, female 4.9–7.0 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs not thickened or curved basal to discoidal cell.

Male. (Revised after Ulmer, 1916 and Mosely and Kimmins, 1953). Ventral process on segment IX small, keel-like; inferior appendages in lateral view, length about twice width, upturned, tapering slightly apically (Fig. 62), in ventral view, broadbased, apices turned slightly mesally (Fig. 63); mesal processes of tergum X not apparent, pair of lateral processes of tergum X broadbased, relatively slender apically, apices hooked upwards or sometimes outwards (Figs 62, 62a–c, 64, 64a–c); phallus relatively long, with ventral subapical process and 1 or 2 endothecal spines embedded subapically (Figs 62–64).

Female. (Revised after Cartwright, 1990). Female genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII relatively straight and without notch. Segment VIII dorsally with a membranous area almost dividing segment. Ninth sternum with pair of darkly pigmented subtrapezoidal sclerites, their inner margins almost touching at base. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 118, 119).

**Remarks.** *Chimarra australica* is a very common, widespread and slightly variable species throughout eastern Australia (latitudinal range 16°34'–38°35'S). Ulmer's, (1916) and Cartwright's, (1990) figures have been redrawn to allow direct comparisons and to accompany the description that is revised in light of new interpretations of *Chimarra* genitalic structures.

### *Chimarra kewarra* sp. nov.

Figures 65–67, 120, 121

**Type material.** Holotype male (specimen CT-287 figured), Queensland, Searys Ck, Rainbow Beach, 25°58'S, 153°04'E, 7 Jan 1986, G. Theischinger (NMV, T-17906). Paratypes. 2 females (specimen CT-310 figured), collected with holotype (NMV).

**Diagnosis.** *Chimarra kewarra* most closely

resembles *C. australica* in general form of male genitalic structures, but is distinguished by having lateral processes of tergum X, with relatively long, upturned or out turned apices and phallus without a ventral process.

**Description.** Head, body and wings dark greyish-brown to black; length of forewing: male 4.7 mm, female 5.5–5.6 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, length about 2.5 times width, upturned, tapering slightly apically (Fig. 65), in ventral view, broad-based, apices turned slightly mesally (Fig. 66); mesal processes of tergum X not apparent, pair of lateral processes of tergum X broadbased, laterally flattened (Figs 65, 66), in ventral view relatively slender apically (Fig. 66), apices hooked upwards; phallus robust, with pair of endothecal spines embedded subapically (Figs 65–67).

Female. Female genitalia relatively short, broad; sternum VII with small keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII relatively straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of lightly pigmented triangular sclerites, length greater than width, their inner margins almost touching at base. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 120, 121).

**Etymology.** *Kewarra* – Southern Queensland Aboriginal word for rainbow (type locality – Rainbow Beach).

**Remarks.** At present *Chimarra kewarra* is known only from the type locality in southeastern Queensland (latitude 25°58'S).

### *Chimarra mouldsi*-group

The *Chimarra mouldsi*-group, complex of four species, *C. mouldsi*, *C. stclairae*, *C. bibaringa* and *C. karakara*, is almost certainly not a natural group, but is characterised by not possessing any of the primary distinguishing characters of the previous groups, but all males have relatively short inferior appendages. Other common but not exclusive characters are dark head, body and

wings, wings unicolorous, tergum X without apparent mesal processes and with short lateral processes or lobes, ventral process on segment IX small and keel-like. All members are from north-east Queensland.

*Chimarra mouldsi* sp. nov.

Figures 68–70, 114, 115

*Chimarra* sp. nov. CT-225.—Walker et al., 1995: 26.—Cartwright, 1997: 17.

*Type material.* Holotype male, Queensland, Upper Freshwater Ck, Whitfield Range nr Cairns, 15 Dec 1974, Moulds (NMV, T-17835). Paratypes. 4 males (specimen CT-225 figured), 1 female, collected with holotype (NMV); 1 male, same locality, 24 Aug 1974, MSM (NMV); 2 females (specimen CT-329 figured), Bellenden Ker Range, Cableway Base Stn, 100 m, 25–31 Oct 1981, Earthwatch/Qld Museum (NMV).

*Other material examined.* Queensland, 1 male, Black Mt Rd, E of Mt Molloy, 5 Dec 1974, MSM; 1 male, 1.5 km SE Kuranda, 16–17 May 1980, I.D. Naumann and J. Cardale (ANIC); 1 female, Cairns, Lake Morris Rd, MV It, 16°55'S, 145°46'E, 16 Nov 1988, K. Walker; 1 female, Currunda Ck, Freshwater Ck trib., on road to Crystal Cascades, nr Cairns, 30 Apr 1979, AW; 2 males, Qld, Lock-Davies Ck Rd, Lamb Range, Mareeba district, 10 Nov 1974, MSM; 1 female, 25 km Gordonvale, Gillies H-way, 4 Sep 1974, MSM; 1 female, Bellenden Ker Range, Cableway Base Stn, 100 m, 1–7 Nov 1981, Earthwatch/Qld Museum; 4 females, Carron Ck, Kirrama State Forest, 17°50'S, 145°35'E, Apr 1993, G. Theischinger; 2 females, Goodard Ck, Kirrama State Forest, 18°06'S, 145°41'E, Apr 1993, G. Theischinger; 1 male (PT-1642), Yuccabine Ck, Kirrama State Forest, 18°12'S, 145°45'E, 2 Jan 1985, R. Pearson.

*Diagnosis.* Grouped with *C. stclairae*, *C. bibaringa* and *C. karakara* but distinguished by having inferior appendages which in lateral view are subquadrate, truncate apically.

*Description.* Brown head, body and wings; length of forewing: male 4.6–5.2 mm, female 4.6–5.2 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, short, robust, subquadrate, truncated, length about 1.5 times width (Fig. 68), in ventral view, length about same as width (Fig. 69); mesal processes of tergum X not apparent, pair of lateral processes of tergum X situated beside phallus, robust, tapering slightly apically (Figs 68, 70); phallus relatively robust with pair of dark, slender endothelial spines embedded subapically (Figs 68–70).

Female. Female genitalia relatively short, broad; sternum VII with short keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII relatively straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of irregular-shaped pigmented areas. Tergum IX with pigmented sclerotised area extending down sides and with truncate apices. Tergum X forming 2 lobes with numerous setae, each with relatively short apical ecrcus (Figs 114, 115).

*Etymology.* *Mouldsi* – named after Max Moulds (collector).

*Remarks.* *Chimarra mouldsii* is an uncommon and distinctive north-eastern Queensland species. (latitudinal range 16°41'–18°12'S).

*Chimarra stclairae* sp. nov.

Figures 71–73, 112, 113

*Chimarra* sp. nov. CT-226.—Walker et al., 1995: 26.—Cartwright, 1997: 17.

*Type material.* Holotype male, Queensland, Birthday Ck, 3.5 km WNN Paluma, 18°59'S, 146°10'E, at light, 17 Feb 1990, R. St Clair (NMV, T-17875). Paratypes. 2 males, same locality and collector as holotype, 8 Oct 1989 (NMV); 7 males, 2 females, same locality and collector as holotype, 19 Jan 1990 (NMV); 1 female (specimen CT-305 figured), same locality and collector as holotype, 17 Feb 1990 (NMV); 1 male (specimen CT-226 figured), same locality and collector as holotype, 1 Apr 1990 (NMV); 2 males, 1 female, Birthday Ck, 3.5 km WNN Paluma, 18°59'S, 146°10'E, at light, 23 Dec 1989, R. St Clair (NMV); 7 males, Birthday Ck, 3.5 km WNN Paluma, 18°59'S, 146°10'E, at light, 17 Mar 1990, R. St Clair (NMV); 1 male, 3 females, Birthday Ck below falls, Mt Spee State Forest, 18°57'S, 146°10'E, 760 m, lt. tr., 29 Mar 1994, A.L. Sheldon (NMV); 1 male, Birthday Ck, iron cabin, Mt Spee State Forest, 18°57'S, 146°10'E, 790 m, lt. tr., 23 Apr 1994, A.L. Sheldon (NMV).

*Other material examined.* Queensland, 1 male, 7 km N of Hopevale Mission, 15°14'S, 145°07'E, 4 Oct 1980, J.C. Cardale (ANIC); 1 male, 1 female, 8–13 km Mt Lewis Rd, off Mossman-Molloy Rd, 22 Apr 1967, D.H. Colless (ANIC); 1 male, 1 female, Kirrama State Forest, Western Fall, 30 May 1971, E.F. Riek (ANIC); 1 male, Birthday Ck, iron cabin, Mt Spee State Forest, 18°57'S, 146°10'E, 790 m, lt. tr., 23 Apr 1994, A.L. Sheldon; 1 male, 3 females, Birthday Ck below falls, Mt Spee State Forest, 18°57'S, 146°10'E, 760 m, lt. tr., 29 Mar 1994, A.L. Sheldon.



**Diagnosis.** *Chimarra stclairae* is grouped with *C. mouldsi*, *C. bibaringa* and *C. karakara* but can be distinguished by having inferior appendages which in lateral view are short, upturned, tapering slightly apically, in ventral view with small process on inner margin.

**Description.** Head, body and wings brown; length of forewing: male 4.6–5.5 mm, female 5.3–5.5 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

**Male.** Ventral process on segment IX small, keel-like; inferior appendages in lateral view, short, length about twice width, upturned, tapering slightly apically (Fig. 71), in ventral view, short, length about twice width, with small process on inner margin (Fig. 72); mesal and lateral processes of tergum X not apparent; phallus relatively short, with pair of long embedded endothelial spines (Figs 71–73).

**Female.** Female genitalia relatively short, broad; sternum VII with short keel-like process. Posterolateral margin of segment VIII with sclerites and associated setae near middle and ventrally. Ventroposterior margin of segment VIII relatively straight and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of squarish depressions. Tergum IX with pigmented sclerotised area extending down sides and with relatively pointed apices. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 112, 113).

**Etymology.** *Stclairae* – named after Ros St Clair (collector).

**Remarks.** This species is known from only northeastern Queensland (latitudinal range 15°14'–18°59'S).

### *Chimarra bibaringa* sp. nov.

Figures 74–76

*Chimarra* sp. nov. CT-227.—Walker et al., 1995: 26.—Cartwright, 1997: 17.

**Type material.** Holotype male, Queensland, Bellenden Ker Range, Cableway Base Stn, 100 m, 17–24 Oct 1981, Earthwatch/Qld Museum (NMV, T-17844). Paratypes. 1 male (specimen CT-227 figured), collected with holotype (NMV); 1 male, same locality and collector, 1–7 Nov 1981 (NMV).

**Other material examined.** Queensland. 1 male, Moses Ck, 4 km N by E Mt Finnigan, 14–16 Oct 1980, J.C. Cardale (ANIC); 1 male, Mossman Gorge, 16 Nov

1979, AN; 2 males, Upper Freshwater Ck, Whitfield Range nr Cairns, 15 Dec 1974, Moulds; 1 male, Upper Freshwater Ck, Whitfield Range nr Cairns, 24 Aug 1974, MSM; 1 male pupa, Little Mulgrave R., 28 Jun 1971, E.F. Riek (ANIC); 1 male, Base cableway, Mt Bellenden Ker, 80 m, 17°16'S, 145°54'E, 19 Oct 1981, E. D. Edwards (ANIC); 1 male, Williams Ck tributary, Mt Spec State Forest, 18°57'S, 146°10'E, 745 m, lt. tr., 13 Nov 1993, A.L. Sheldon; 4 males, Little Crystal Ck, Mt Spec, 29 May 1971, E.F. Riek (ANIC).

**Diagnosis.** This species is grouped with *C. mouldsi*, *C. stclairae* and *C. karakara* but can be distinguished by having lateral processes of tergum X with obvious elongate processes ventral to phallus.

**Description.** Head, body and wings dark brown to blackish; length of forewing: male 4.5–5.2 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

**Male.** Ventral process on segment IX small, keel-like; inferior appendages in lateral view, short, subovate, length about 2.5 times width (Fig. 74), in ventral view, length about twice width, broadbased, tapering and curved apically (Fig. 75); mesal processes of tergum X not apparent, lateral processes of tergum X with elongate ventral processes, extending near apices of inferior appendages; phallus relatively robust with no embedded endothelial spines apparent (Figs 74–76).

**Female unknown.**

**Etymology.** *Bibaringa* – Queensland Aboriginal word for mountain.

**Remarks.** *Chimarra bibaringa* is a distinctive and uncommon north-eastern species (latitudinal range 15°48'–19°00'S).

### *Chimarra karakara* sp. nov.

Figures 77–79, 116, 117

*Chimarra* sp. n. F.—Wells and Cartwright, 1993: 227.

*Chimarra* sp. nov. CT-222.—Cartwright, 1997: 17.

**Type material.** Holotype male, Queensland, Gunshot Ck, Telegraph Crossing, UV lt, 11°44'S, 142°29'E, 14–15 Feb 1992, Cartwright and Wells (NMV, T-17847). Paratypes. 1 male, collected with holotype (NMV); 1 male (specimen CT-273 figured) same locality and collectors, 18 Feb 1992; 2 males, 2 females (specimen CT-300 figured) same locality and collectors, 18 Feb 1992; 10 males, 11 females, same locality and collectors, 17 Feb 1992 (NMV).

*Other material examined.* Queensland. Iron Range, Mellwraith Range, near Cooktown, near Cairns, Belenden Ker Range, Kirrama State Forest, Mt Spee State Forest, Eungella National Park (ANIC, NMV, QM). List of localities available from author.

*Diagnosis.* *Chimarra karakara* is grouped with *C. mouldsi*, *C. stclairae* and *C. bibaringa* but can be distinguished by having relatively long phallus with bulbous head with 3 obvious and characteristic small dark endothecal spines.

*Description.* Head, body and wings dark brown to blackish; length of forewing: male 4.4–5.8 mm, female 5.1–6.7 mm; wing venation: forewing with forks 1, 2, 3 and 5 present; hindwing with forks 2, 3 and 5 present. In forewing, vein Rs thickened and curved slightly basal to discoidal cell.

Male. Ventral process on segment IX small, keel-like; inferior appendages in lateral view, short, subovate, length about 1.5 times width (Fig. 77), in ventral view, length about 2.5 times width, curved slightly apically (Fig. 78); no mesal processes of tergum X apparent, pair of lateral processes of tergum X short; phallus relatively long, in lateral view with bulbous head with 3 obvious and characteristic embedded small dark endothecal spines (Figs 77–79).

Female. Female genitalia relatively short, broad; sternum VII with short keel-like process. Postscroteral margin of segment VIII with sclerites and associated setae dorsally, near middle and ventrally. Ventral pair of sclerites relatively narrowly separated, with connecting posterior margin of segment VIII slightly convex and without notch. Segment VIII dorsally with membranous area almost dividing segment. Ninth sternum with pair of oblong pigmented areas. Tergum IX with pigmented sclerotised area extending down sides and with pointed apices. Tergum X forming 2 lobes with numerous setae, each with relatively short apical cercus (Figs 116, 117).

*Etymology.* *Karakara* – Queensland Aboriginal word for black (body and wings colour).

*Remarks.* *Chimarra karakara* is a very common and distinctive dark species found throughout northeastern Queensland (latitudinal range 11°44'–21°28'S).

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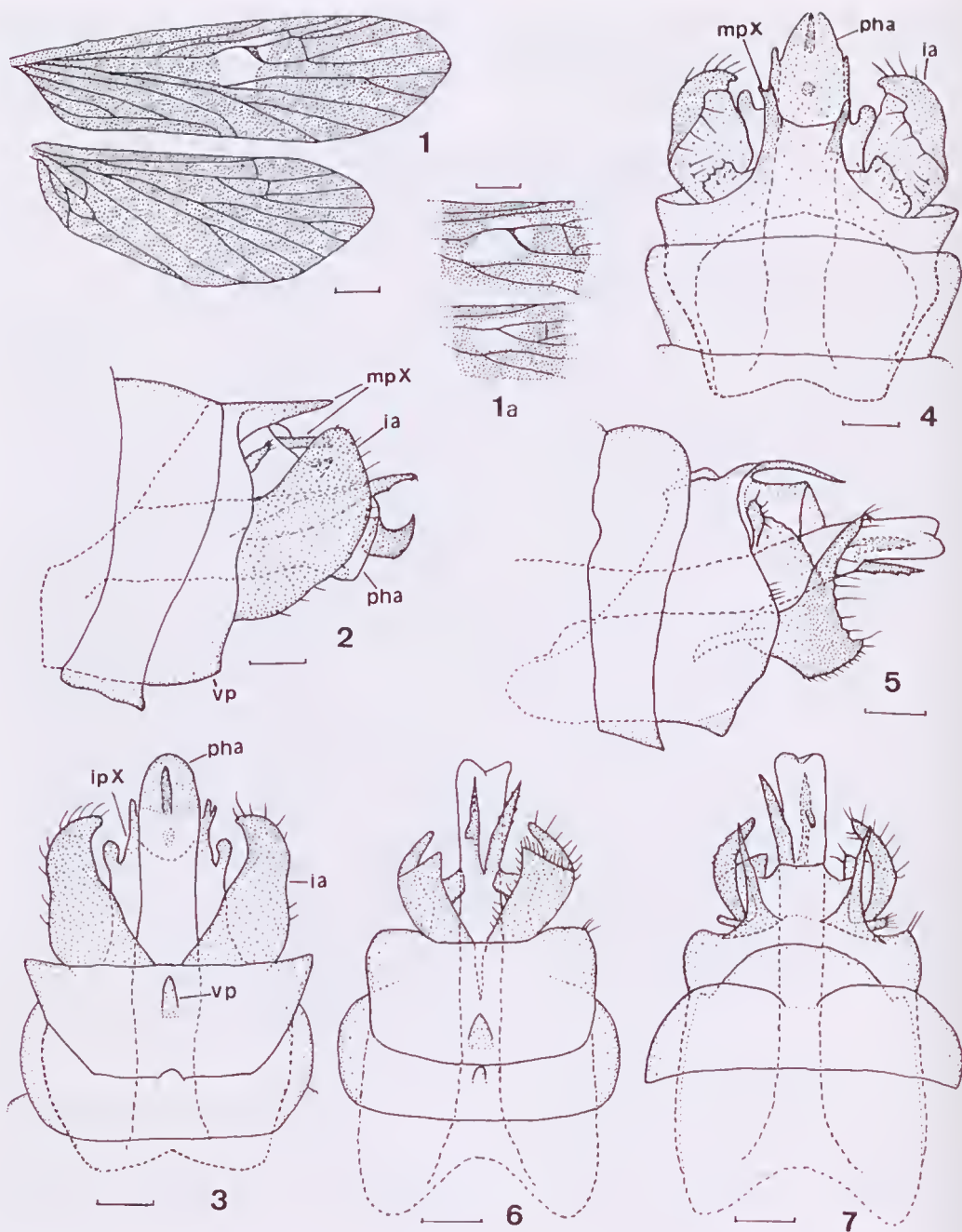
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### Index and checklist of species of *Chimarra* from Australia

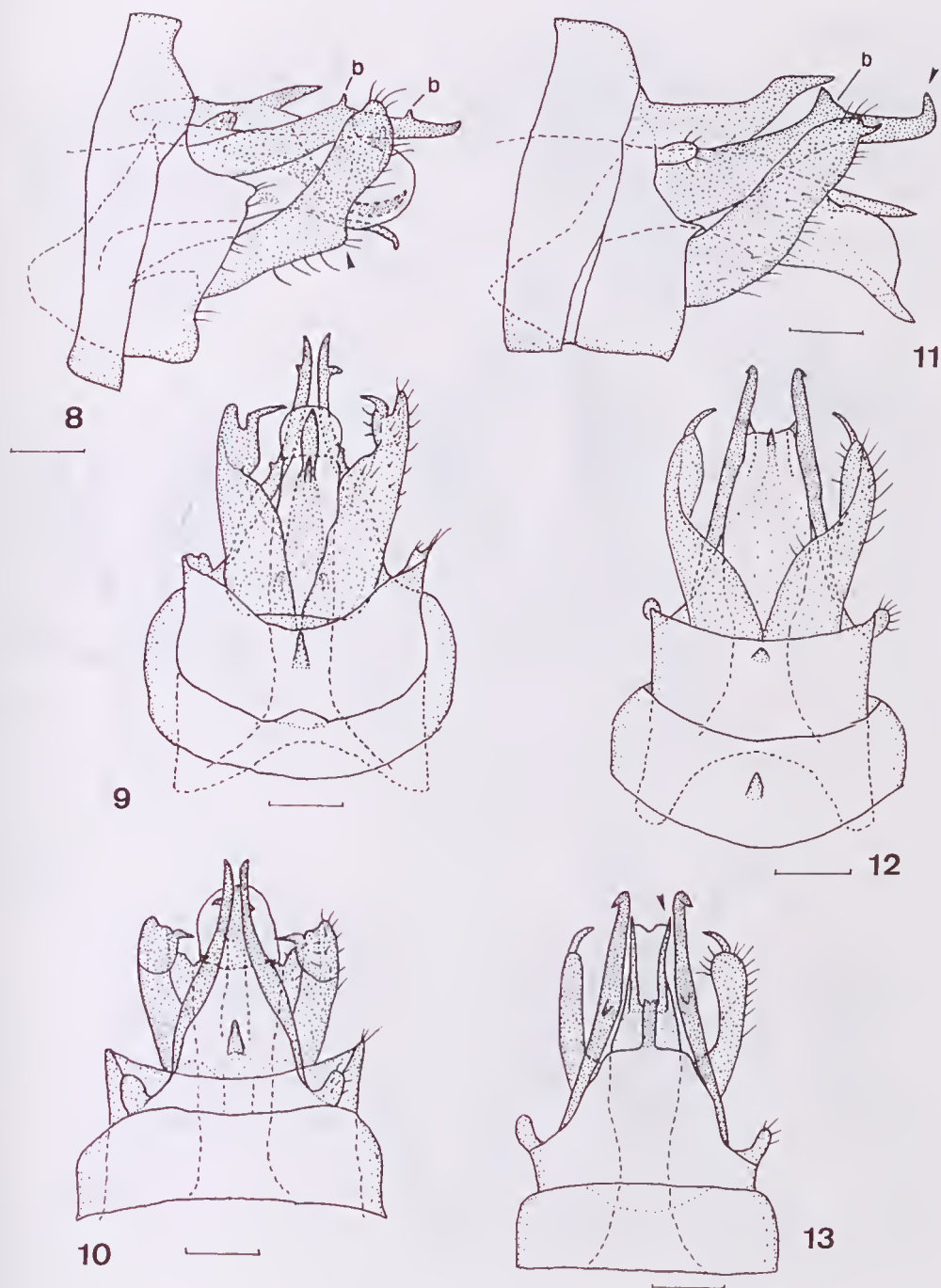
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<i>C. karakara</i> sp. nov.	415	77–79	116–117
<i>C. kewarra</i> sp. nov.	413	65–67	120–121
<i>C. larapinta</i> sp. nov.	401	14–16	
<i>C. locolo</i> sp. nov.	400	1a, 5–7	82–83
<i>C. luminaris</i> sp. nov.	399	1–4	80–81
<i>C. monticola</i> Kimmins, 1953	412	56–61	122–123
<i>C. monldsi</i> sp. nov.	413	68–70	114–115
<i>C. nabilla</i> sp. nov.	409	50–52	102–103
<i>C. natalicia</i> sp. nov.	404	26–28	104–105
<i>C. nevoissi</i> sp. nov.	405	29–31	108–109
<i>C. orumba</i> sp. nov.	402	17–19	84–85
<i>C. pillara</i> sp. nov.	403	20–22	92–93
<i>C. pita</i> sp. nov.	411	56–58	98–99
<i>C. rannka</i> sp. nov.	406	35–37	
<i>C. stclairae</i> sp. nov.	413	71–73	112–113
<i>C. tallawalla</i> sp. nov.	407	38–40	106–107
<i>C. uranka</i> Mosely, 1953	406	32–34	94–95
<i>C. wooroonooran</i> sp. nov.	408	41–43	110–111
<i>C. yandala</i> sp. nov.	403	23–25	90–91
<i>C. yoolumba</i> sp. nov.	409	47–49	100–101



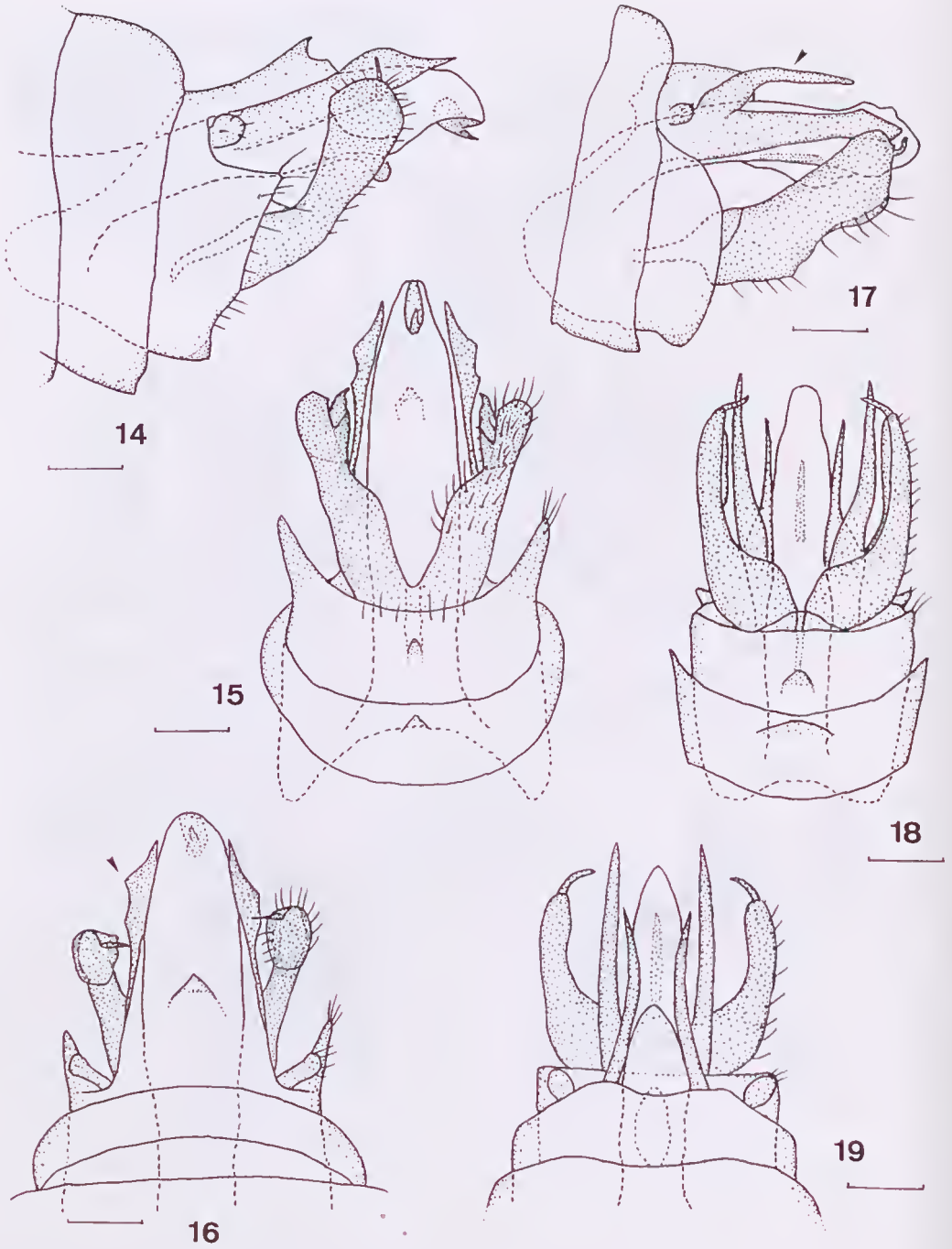
Figures 1-7. *Chimarra* spp. 1-1a: Wings. 1: *Chimarra luminaris* sp. nov. forewing and hindwing. 1a: *Chimarra locolo* sp. nov. section of forewing and hindwing. 2-7: Male genitalia in lateral, ventral and dorsal views. 2-4: *Chimarra luminaris* sp. nov. 5-7: *Chimarra locolo* sp. nov.

Abbreviations: ia, inferior appendages; lp X, lateral process of abdominal tergum X; mp X, mesal process of abdominal tergum X; pha, phallus; vp, ventral process of abdominal segment IX. Scale lines: 1-1a, 0.5 mm; 2-7, 0.1 mm.



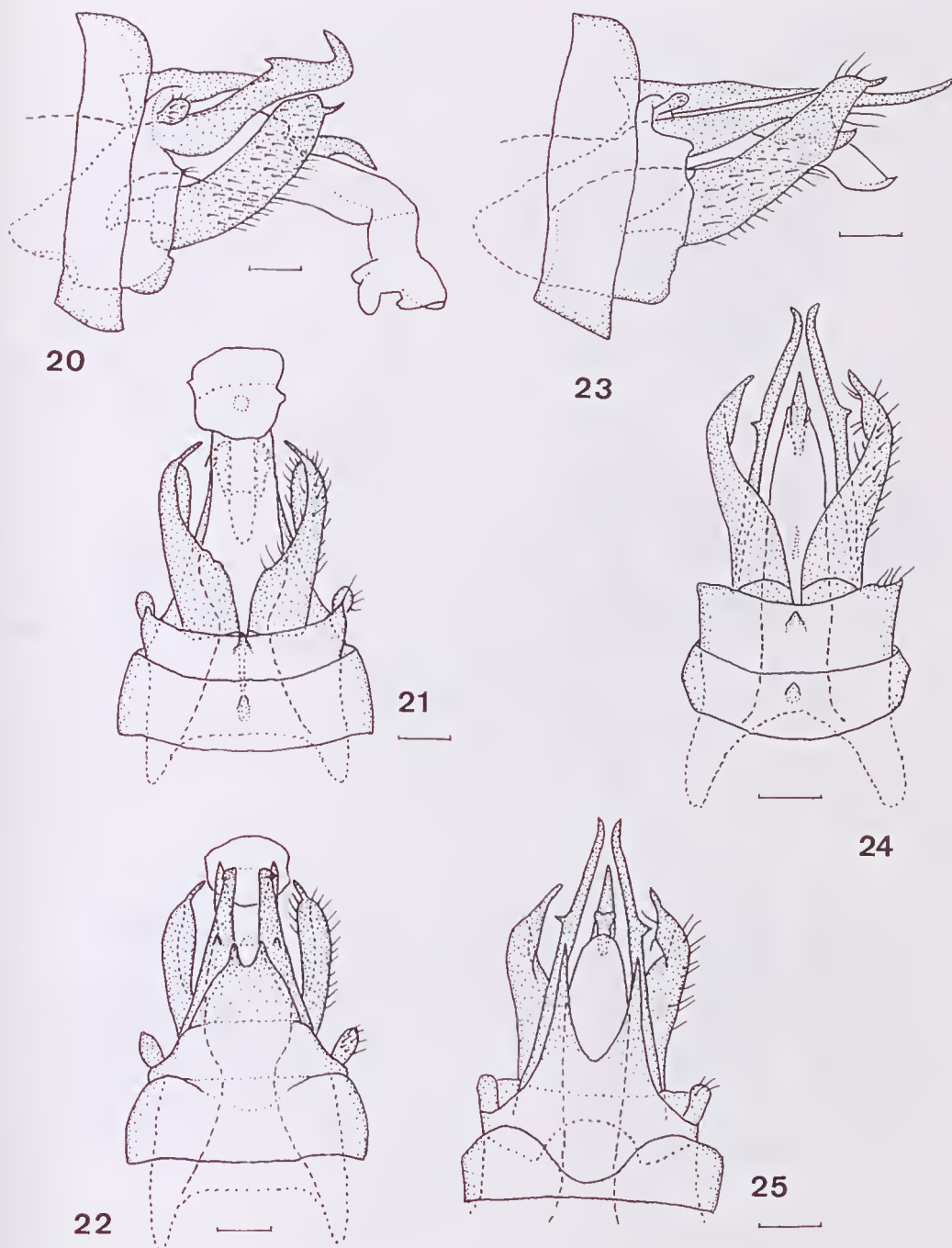


Figures 8–13. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 8–10: *Chimarra kaiya* sp. nov. 11–13: *Chimarra buigooia* sp. nov. Abbreviation: b, 'barb-like projection'. Scale lines 0.1 mm.

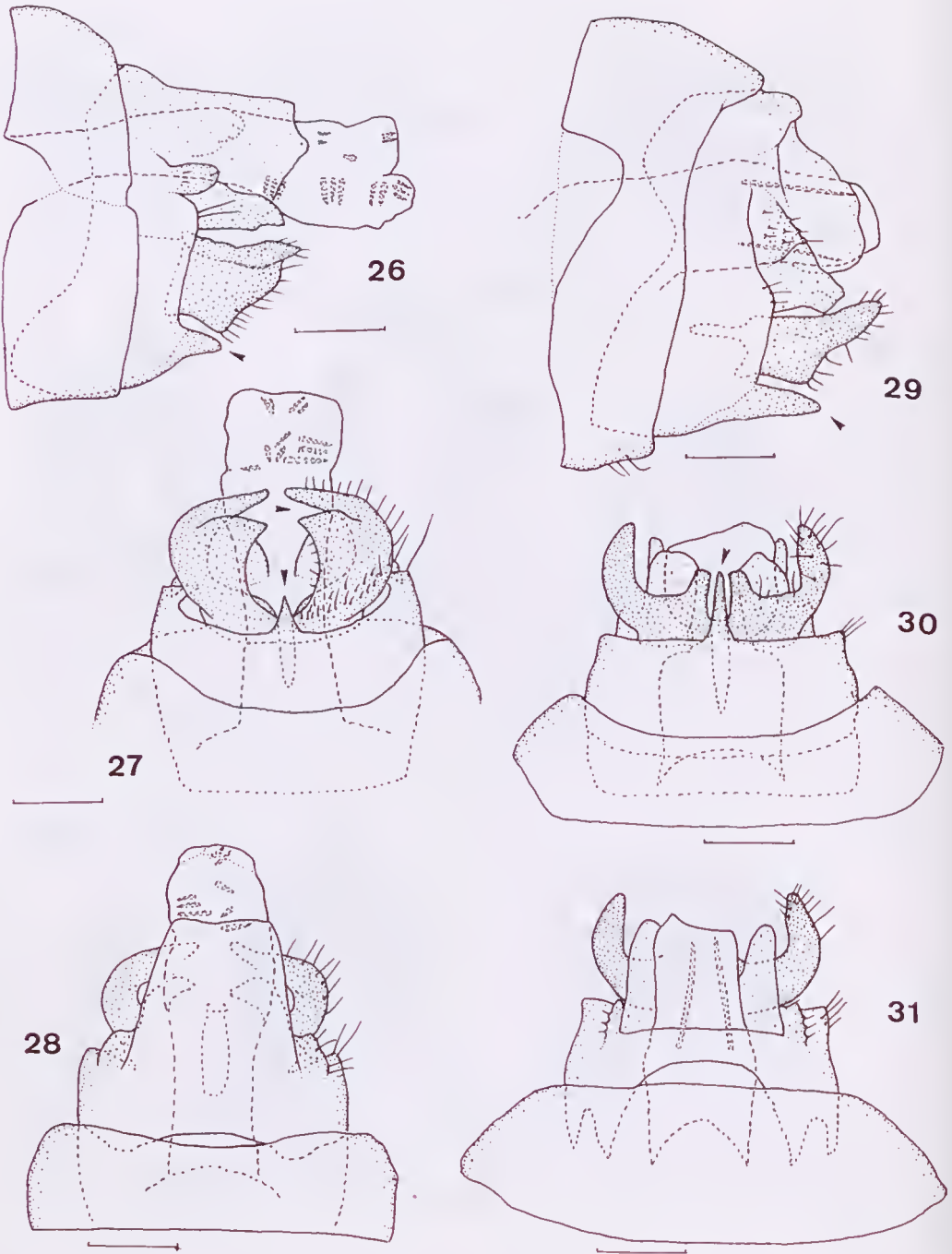


Figures 14–19. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 14–16: *Chimarra larapinta* sp. nov. 17–19: *Chimarra orunbera* sp. nov. Scale lines 0.1 mm.



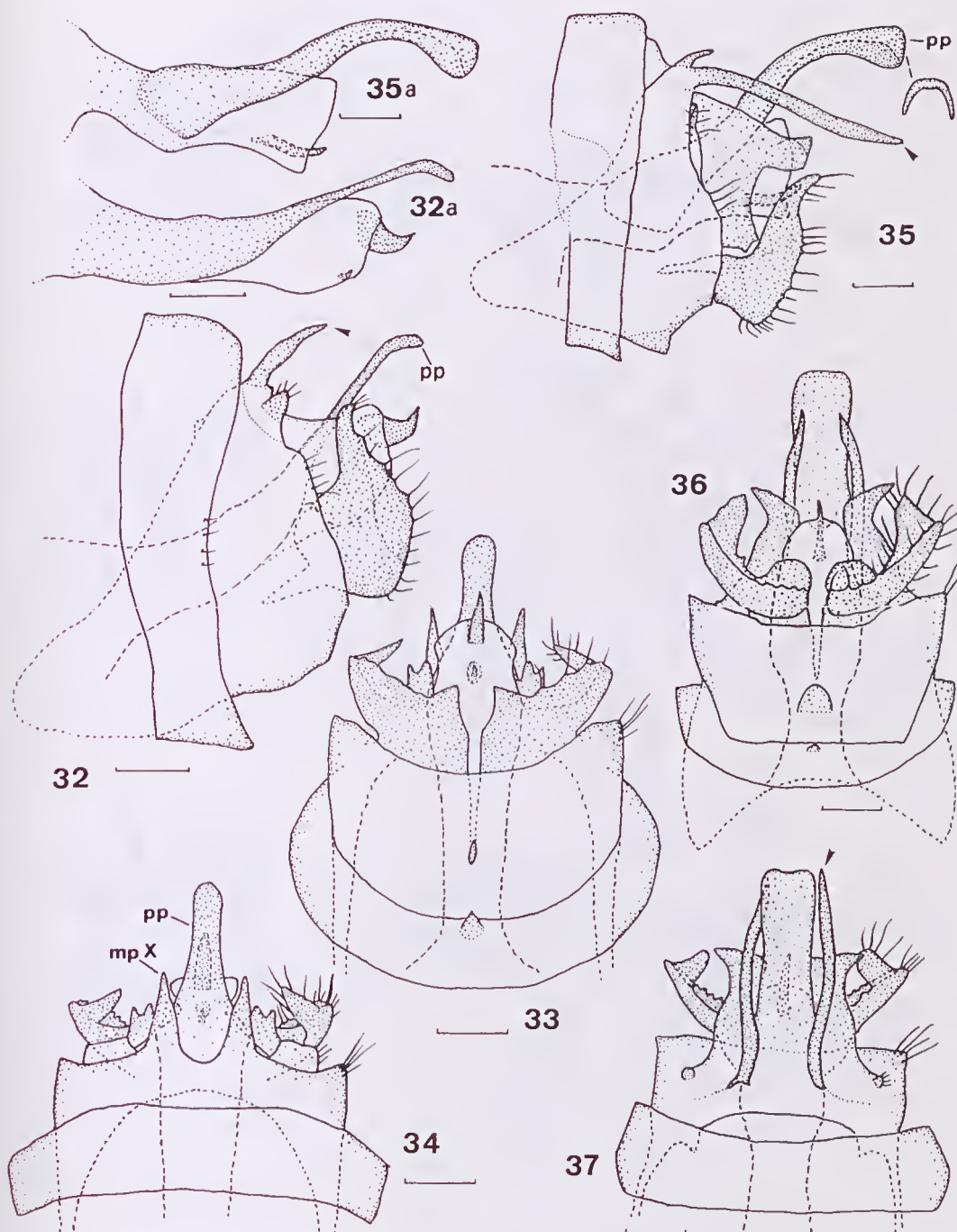


Figures 20–25. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 20–22: *Chimarra pillara* sp. nov. 23–25: *Chimarra yandala* sp. nov. Scale lines 0.1 mm.

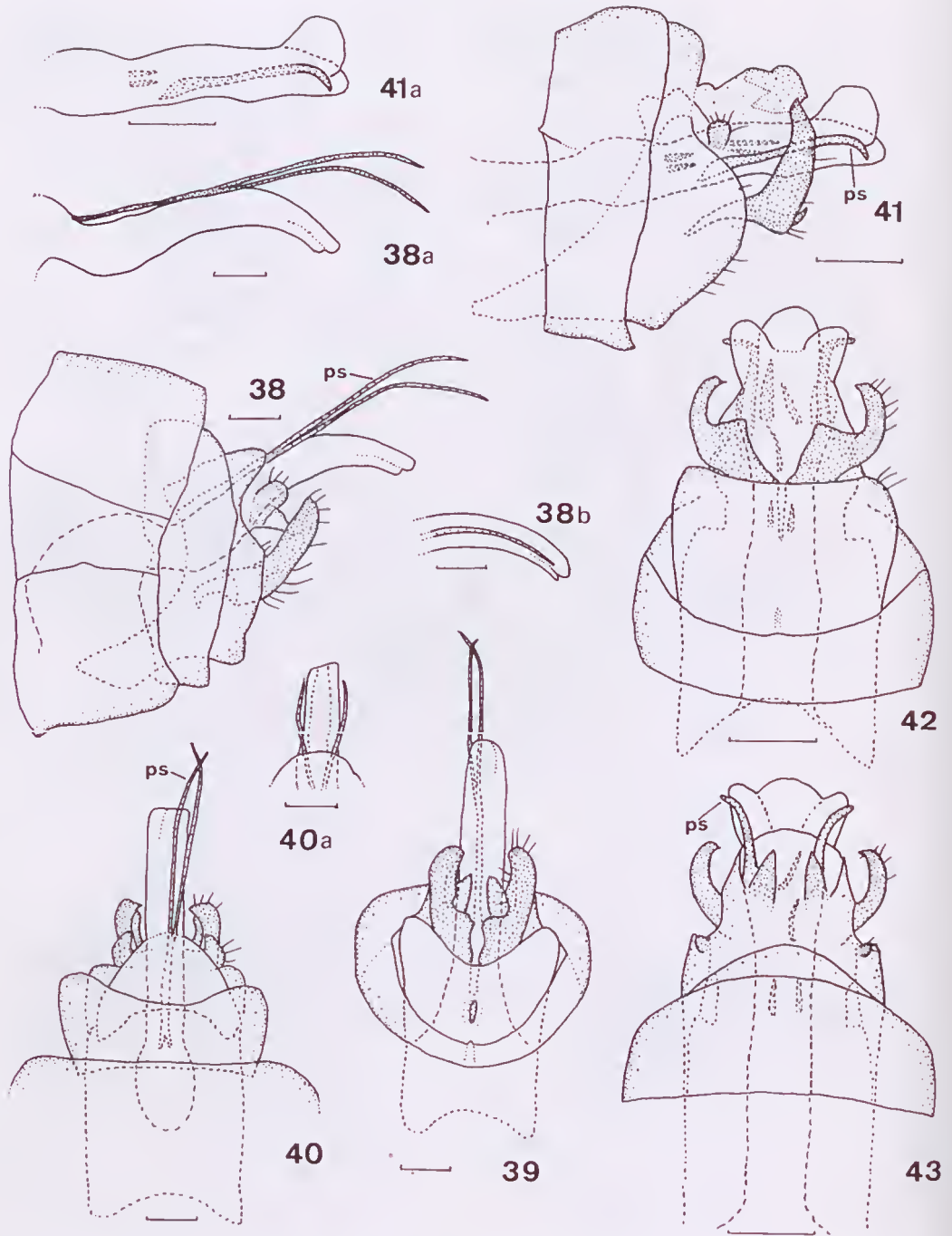


Figures 26–31. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 26–28: *Chimarra natalicia* sp. nov. 29–31: *Chimarra nevoissi* sp. nov. Scale lines 0.1 mm.



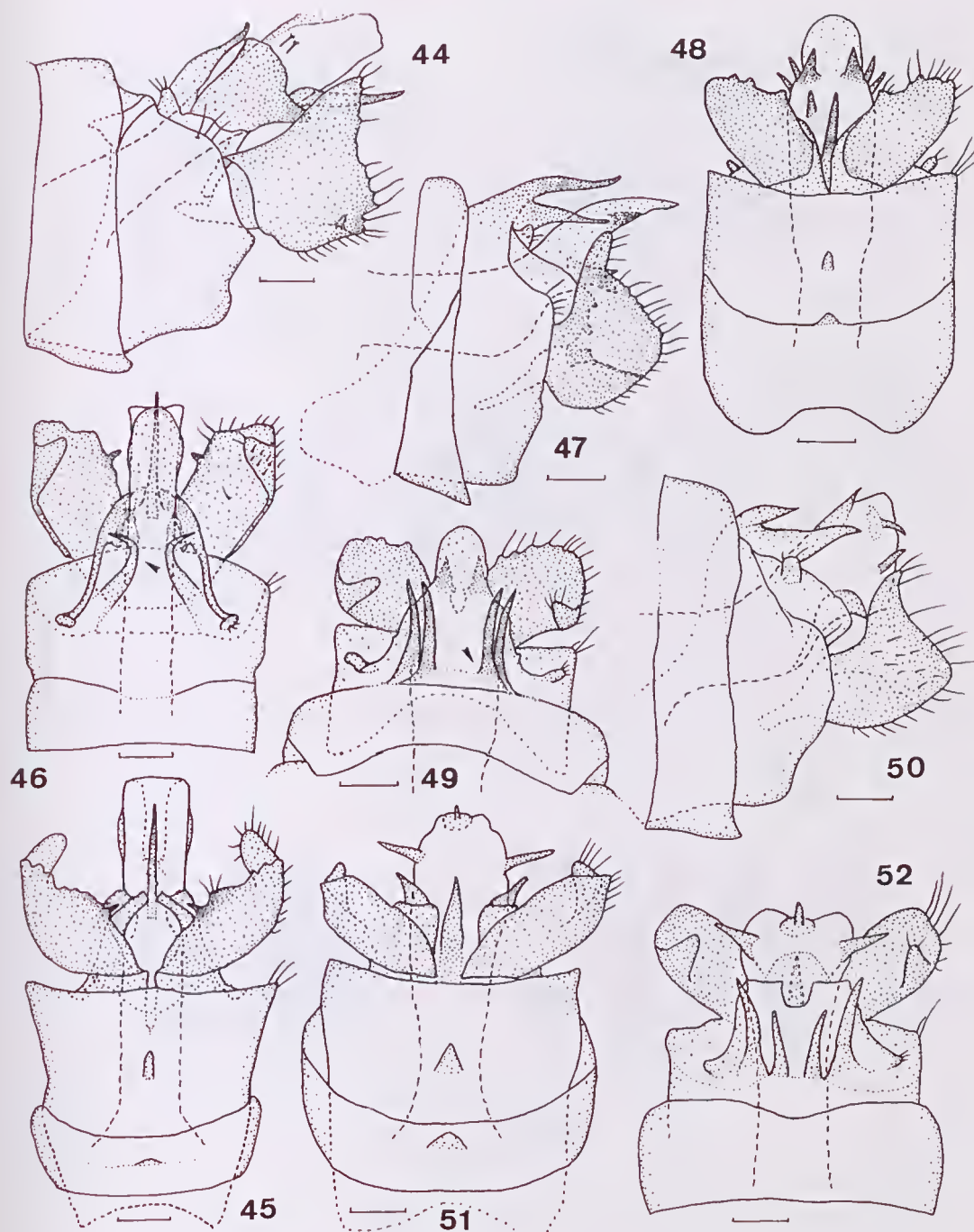


Figures 32–37. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 32–34: *Chimarra uranka* Mosely. 32a: lateral view of phallic complex. 35–37: *Chimarra ranuka* sp. nov. 35a: lateral view of phallic complex. Abbreviations: mp X, mesal process of abdominal tergum X; pp, dorsal phallic projection. Scale lines 0.1 mm.

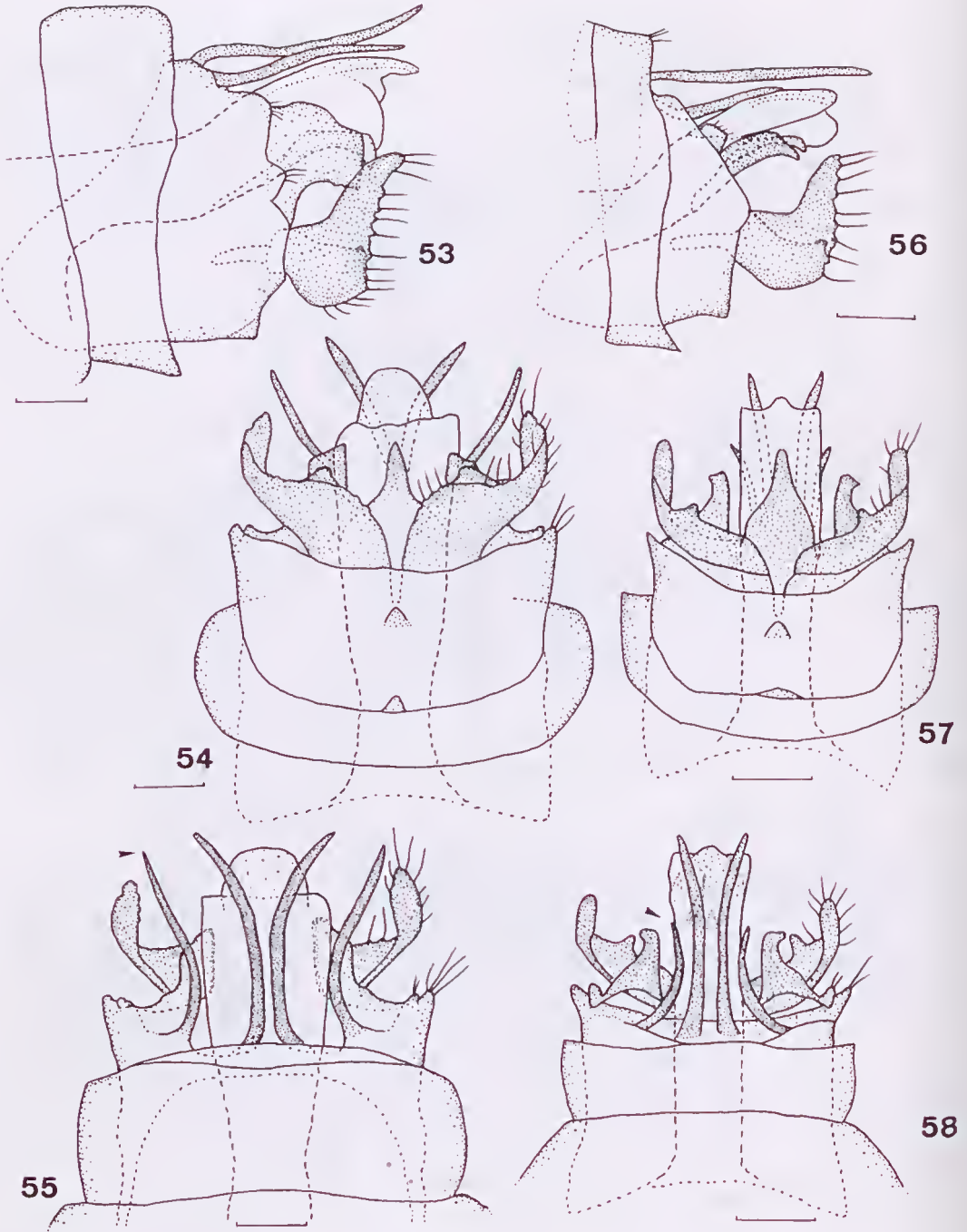


Figures 38–43. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 38–40: *Chimarra tallawalla* sp. nov. 38a: lateral view of phallic complex. 38b, 40a: *Chimarra tallawalla* sp. nov. (CT-318–Chandlers Ck., NE–NSW), phallus and phallic spines lateral and dorsal views. 41–43: *Chimarra woornooran*. 41a: lateral view of phallic complex. Abbreviation: ps, phallic spine. Scale lines 0.1 mm.

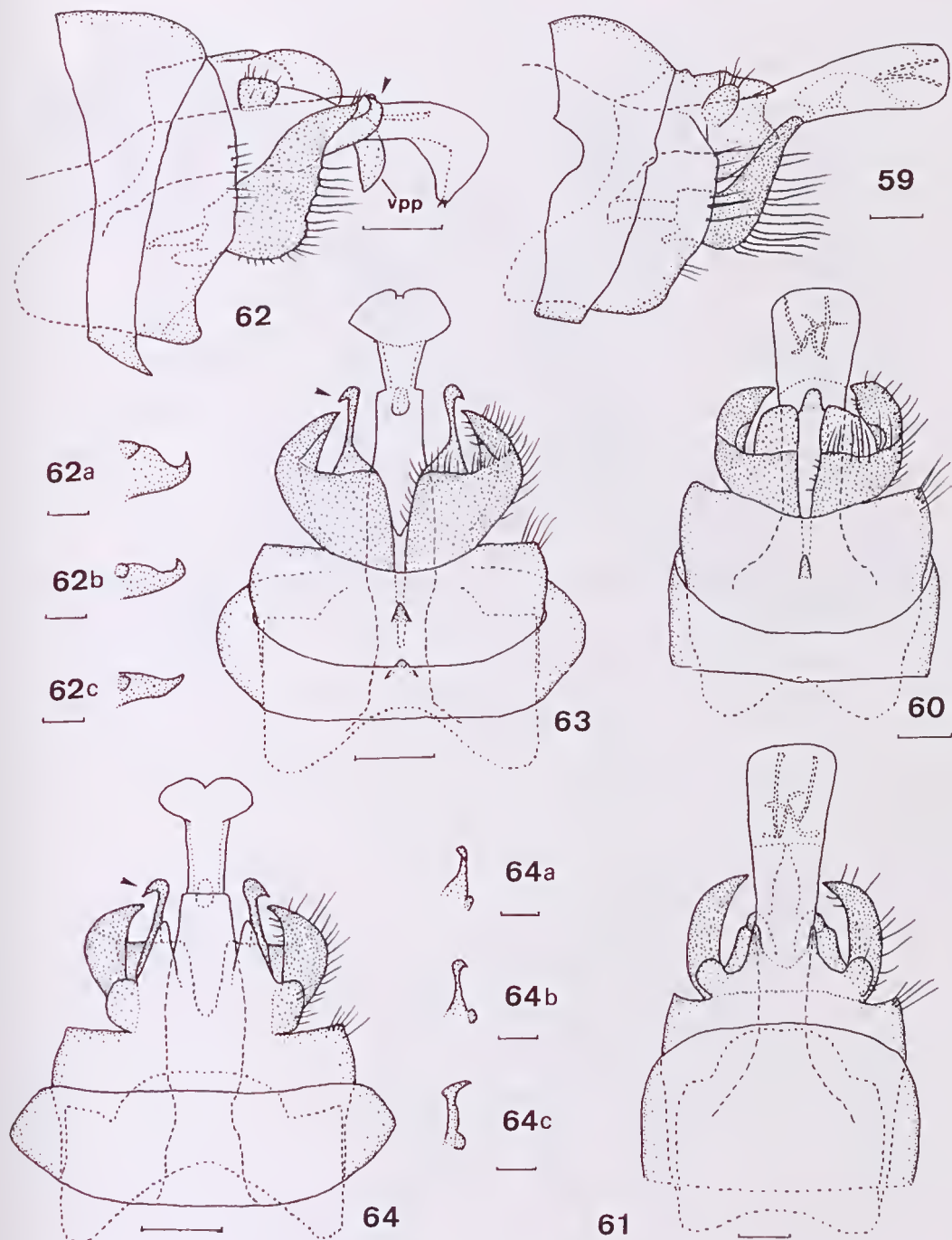




Figures 44–52. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 44–46: *Chimarra adaluma* sp. nov. 47–49: *Chimarra yoolumba* sp. nov. 50–52: *Chimarra nabilla* sp. nov. Scale lines 0.1 mm.

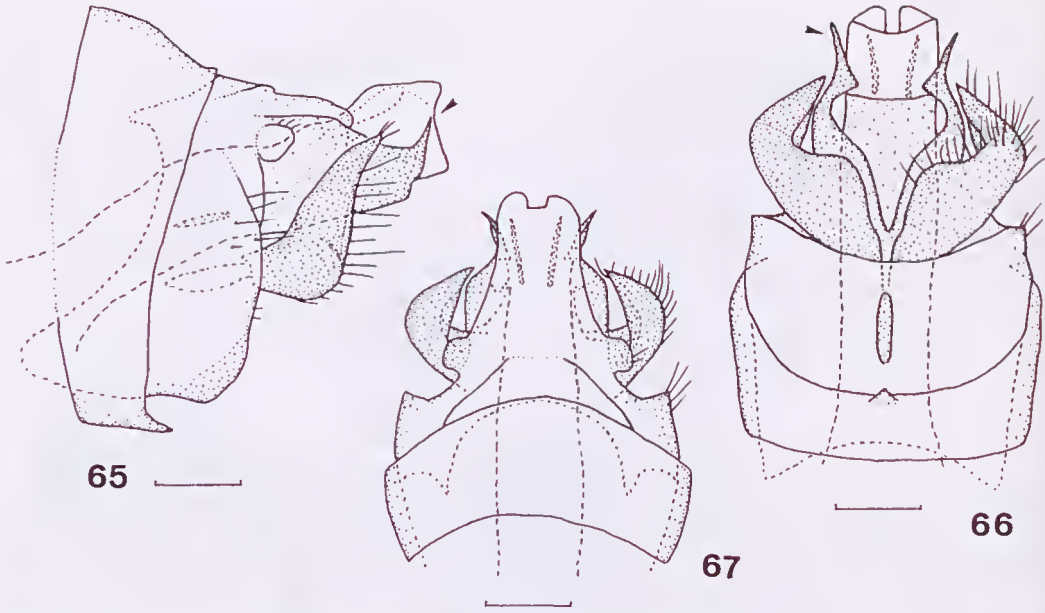


Figures 53–58. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 53–55: *Chimarra akruna* sp. nov. 56–58: *Chimarra pita* sp. nov. Scale lines 0.1 mm.

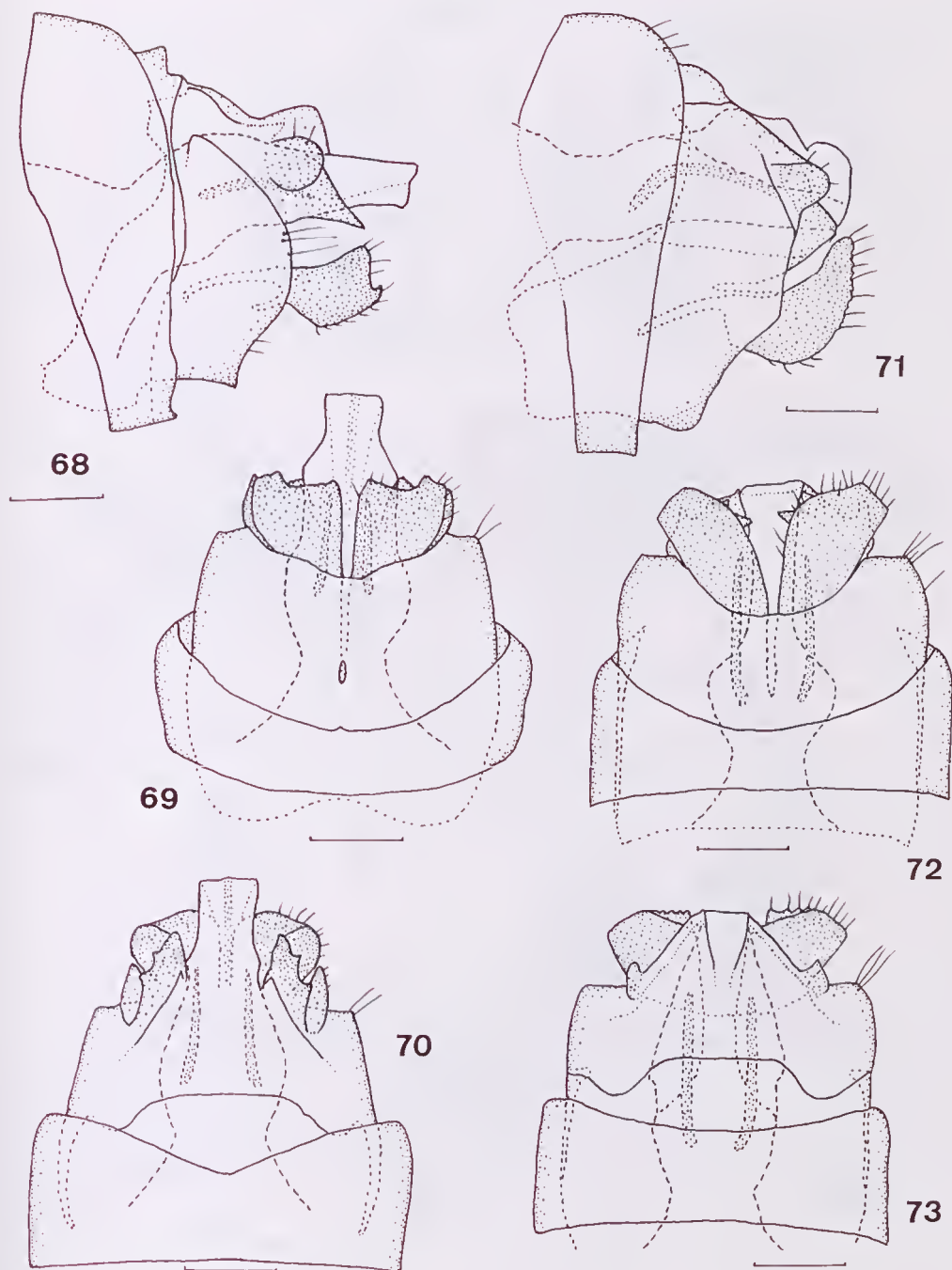


Figures 59–64. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 59–61: *Chimarra monticola* Kimmins. 62–64: *Chimarra australica* Ulmer. 62a,b,c–64a,b,c: *Chimarra australica* Ulmer (CT-277, Brogo R., SE-NSW; CT-292, Finch Hatton Gorge, NE-Qld; CT-309, Birthday Ck, NE-Qld), lateral process of tergum X, lateral and dorsal views. Abbreviation: vpp, ventral process of phallus. Scale lines 0.1 mm.

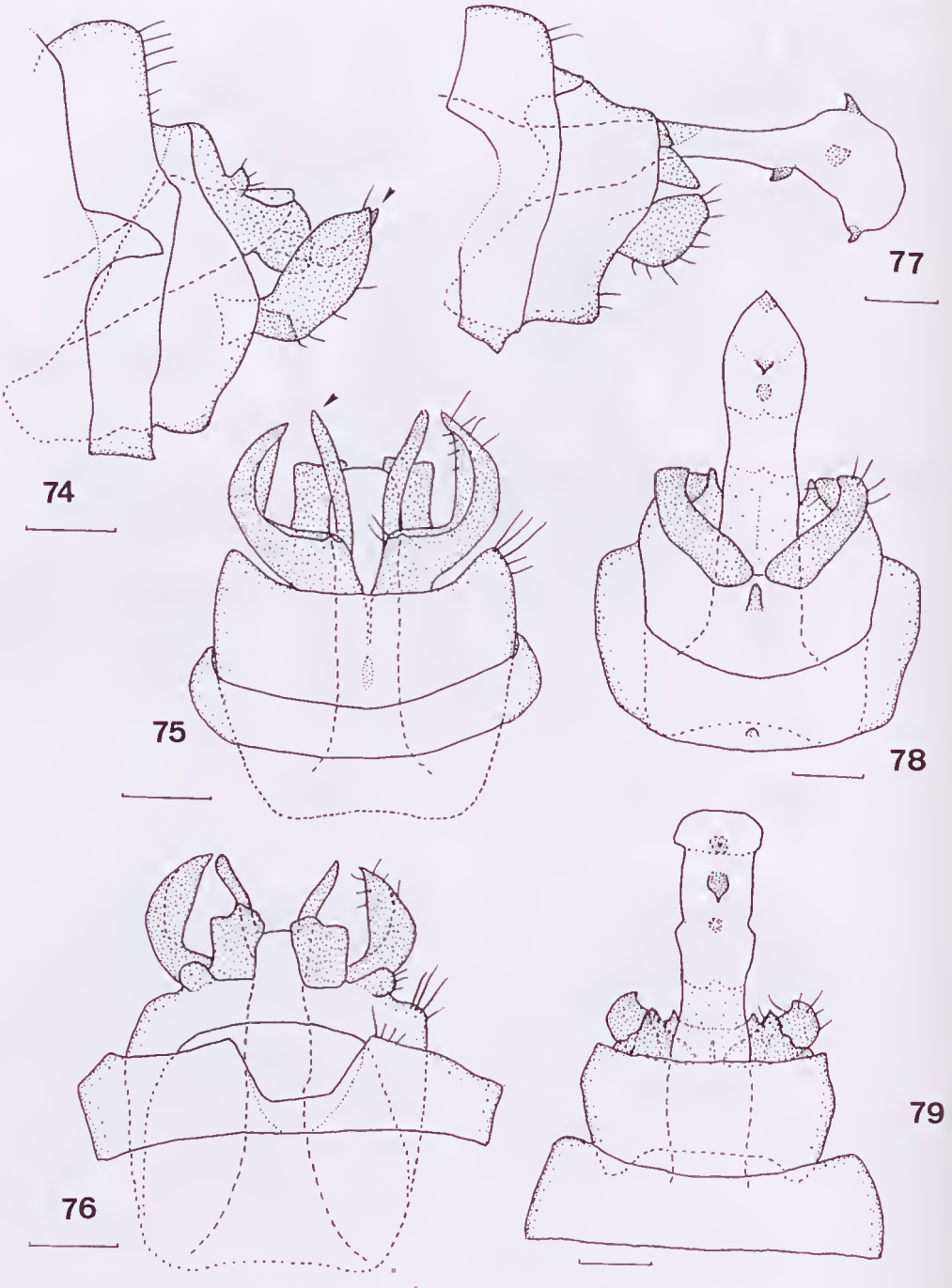




Figures 65–67. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 65–67: *Chimarra kewarra* sp. nov. Scale lines 0.1 mm.

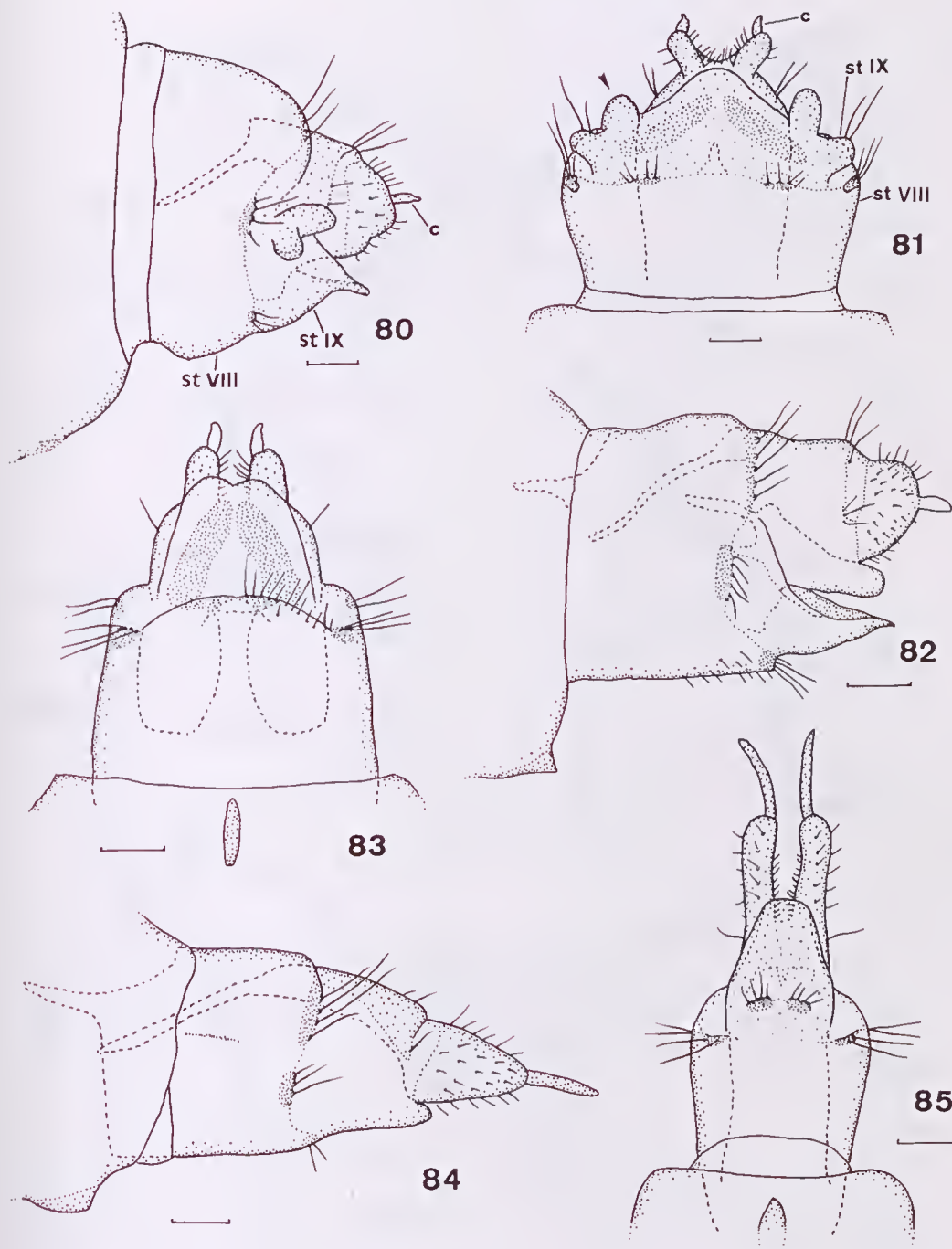


Figures 68–73. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 68–70: *Chimarra moultsi* sp. nov. 71–73: *Chimarra stclairae* sp. nov. Scale lines 0.1 mm.

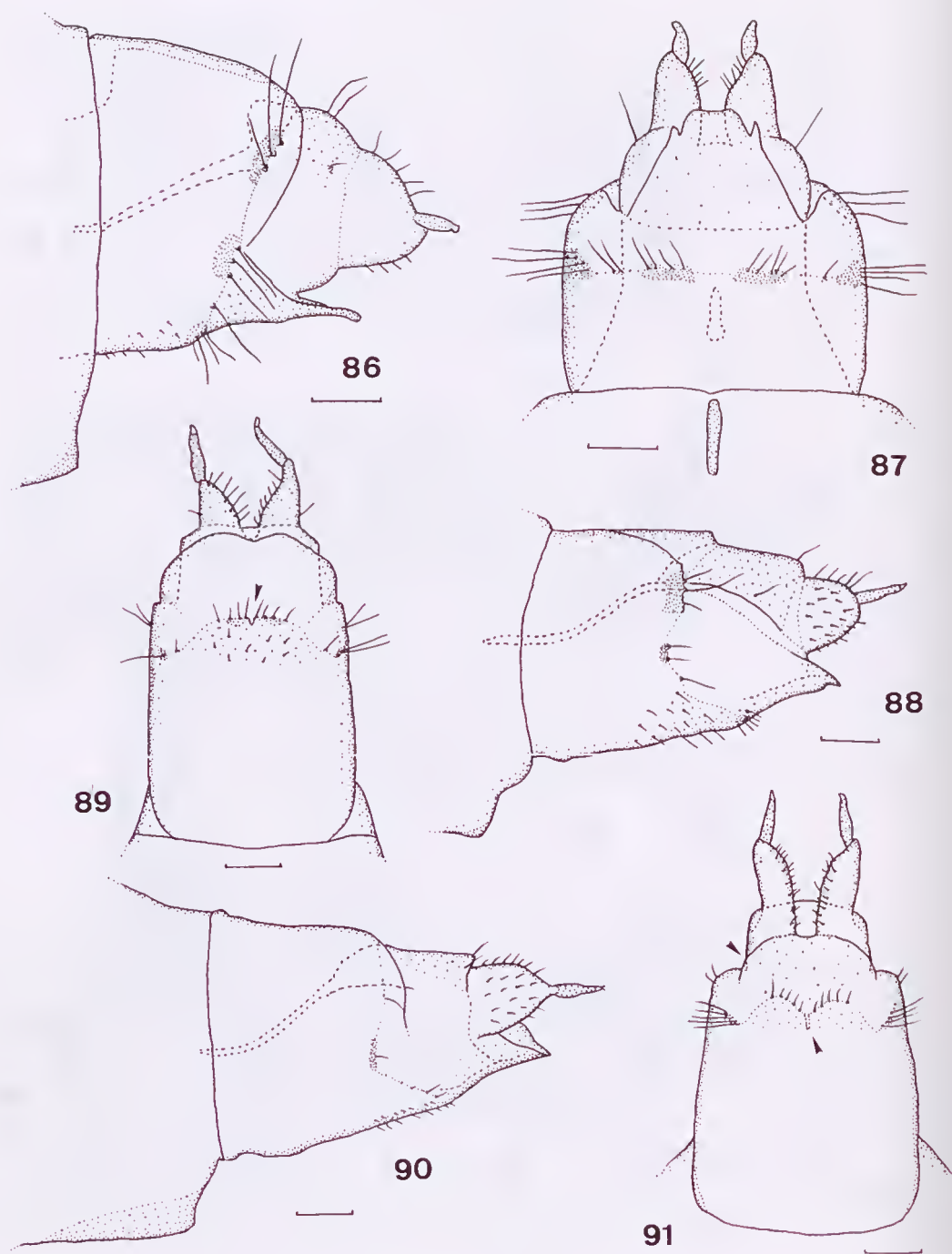


Figures 74–79. *Chimarra* spp. Male genitalia in lateral, ventral and dorsal views. 74–76: *Chimarra bibaringa* sp. nov. 77–79: *Chimarra karakara* sp. nov. Scale lines 0.1 mm.

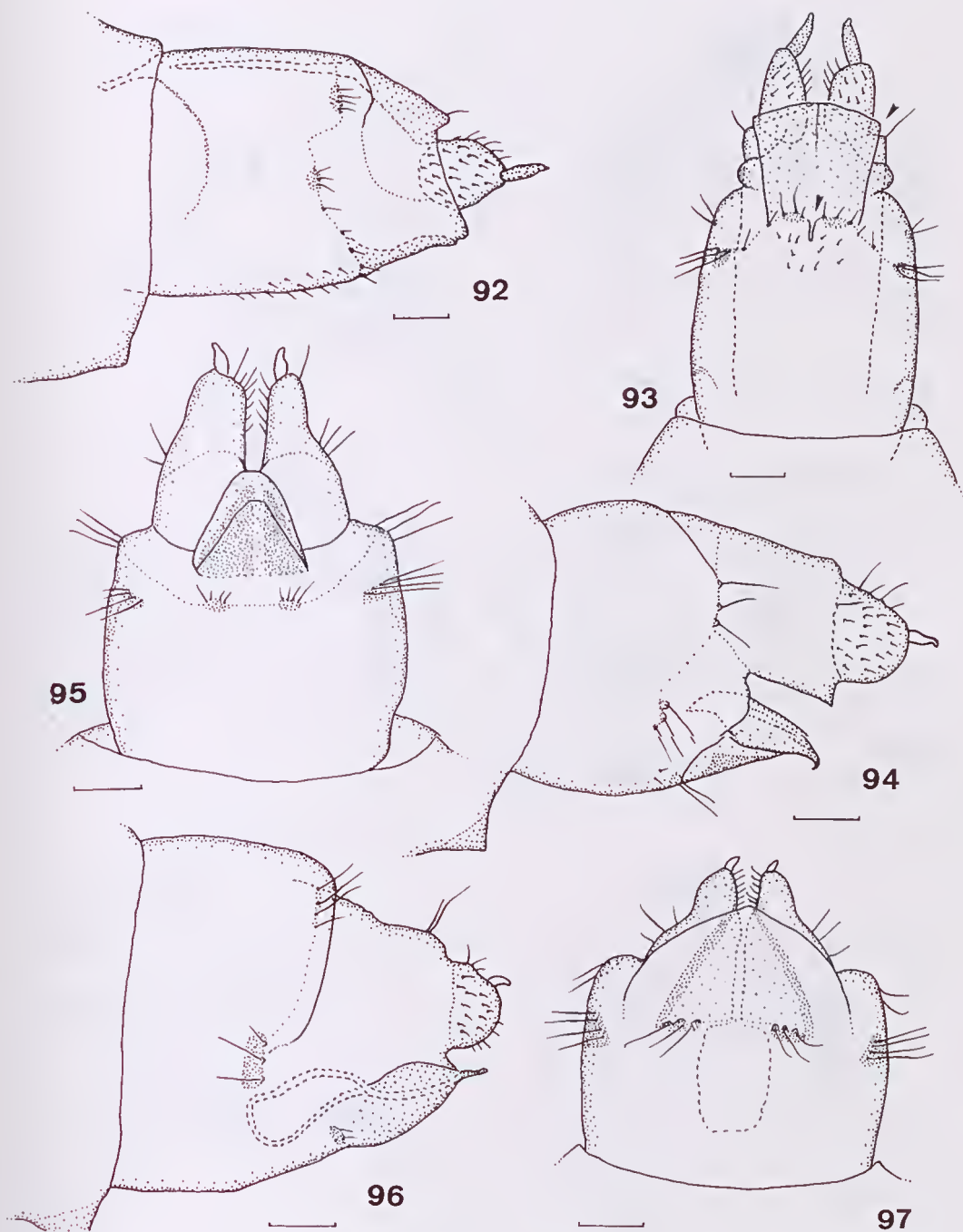




Figures 80–85. *Chimarra* spp. Female genitalia in lateral and ventral views. 80–81: *Chimarra luminaris* sp. nov. 82–83: *Chimarra locolo* sp. nov. 84–85: *Chimarra orumbera* sp. nov. Abbreviations: c, cercus; st VIII, sternum abdominal segment VIII; st IX, sternum abdominal segment IX. Scale lines 0.1 mm.

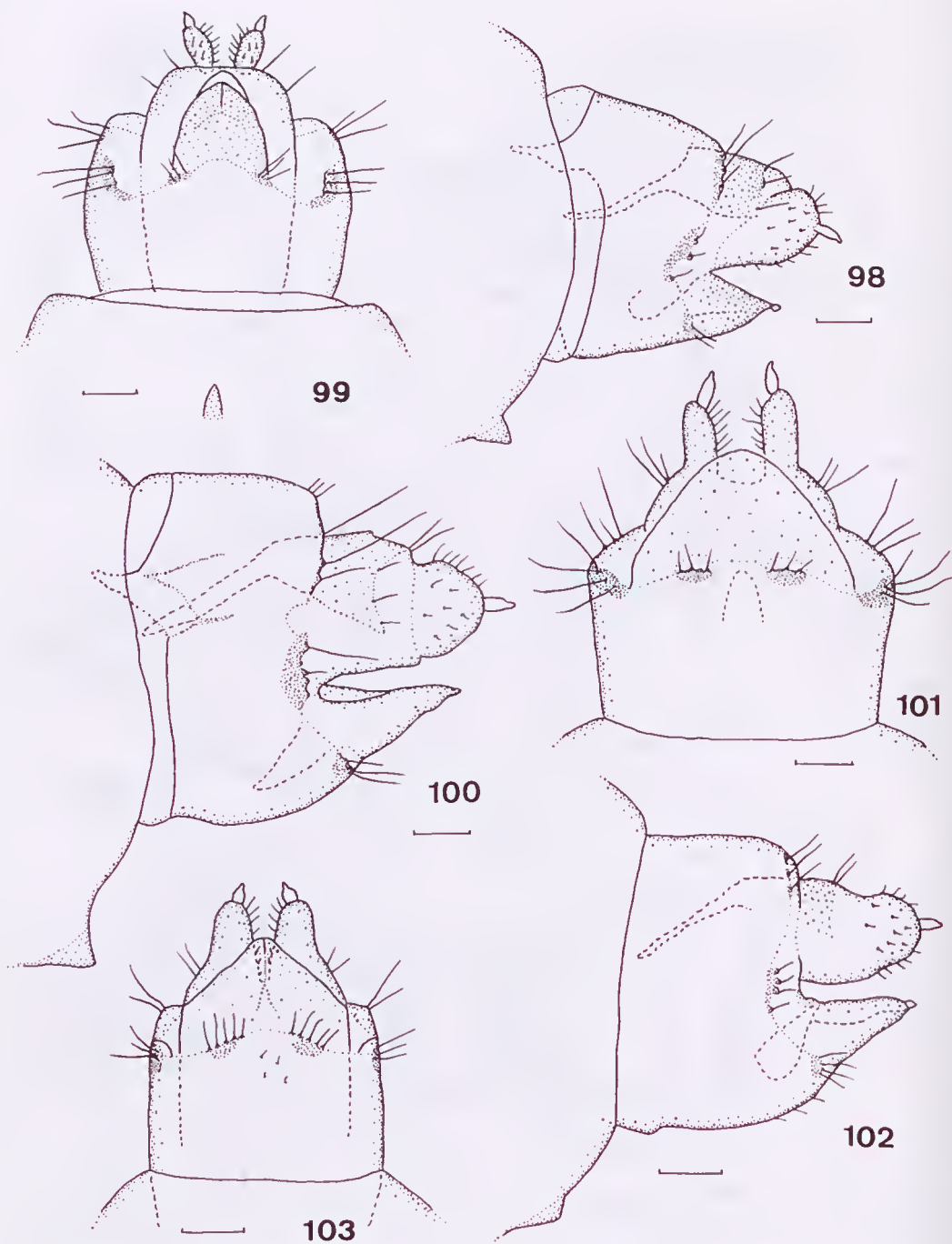


Figures 86–91. *Chimarra* spp. Female genitalia in lateral and ventral views. 86–87: *Chimarra kaiya* sp. nov. 88–89: *Chimarra yandala* sp. nov. 90–91: *Chimarra bungoona* sp. nov. Scale lines 0.1 mm.

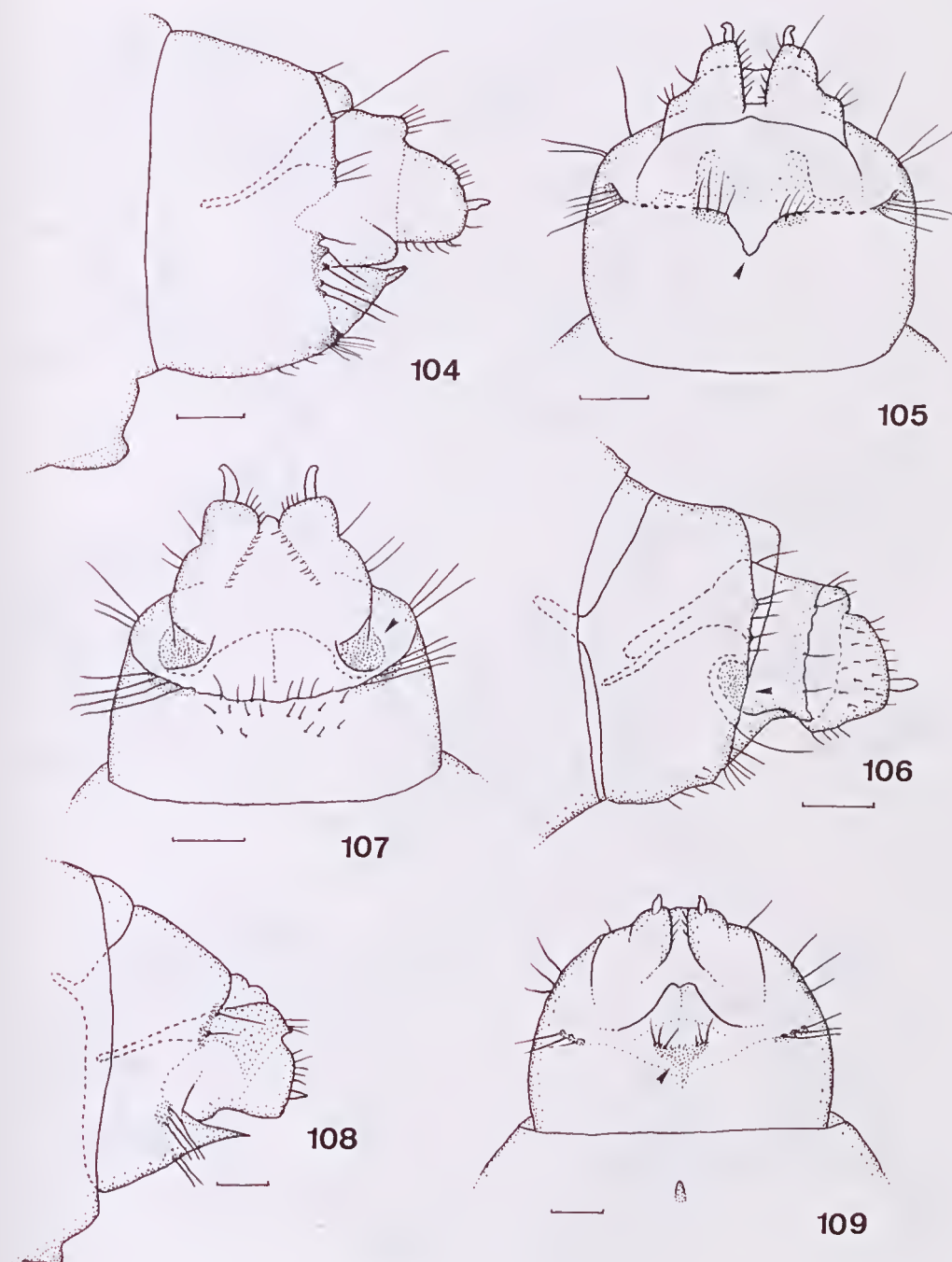


Figures 92–97. *Chimarra* spp. Female genitalia in lateral and ventral views. 92–93: *Chimarra pillara* sp. nov. 94–95: *Chimarra uranka* Mosely. 96–97: *Chimarra akruna* sp. nov. Scale lines 0.1 mm.

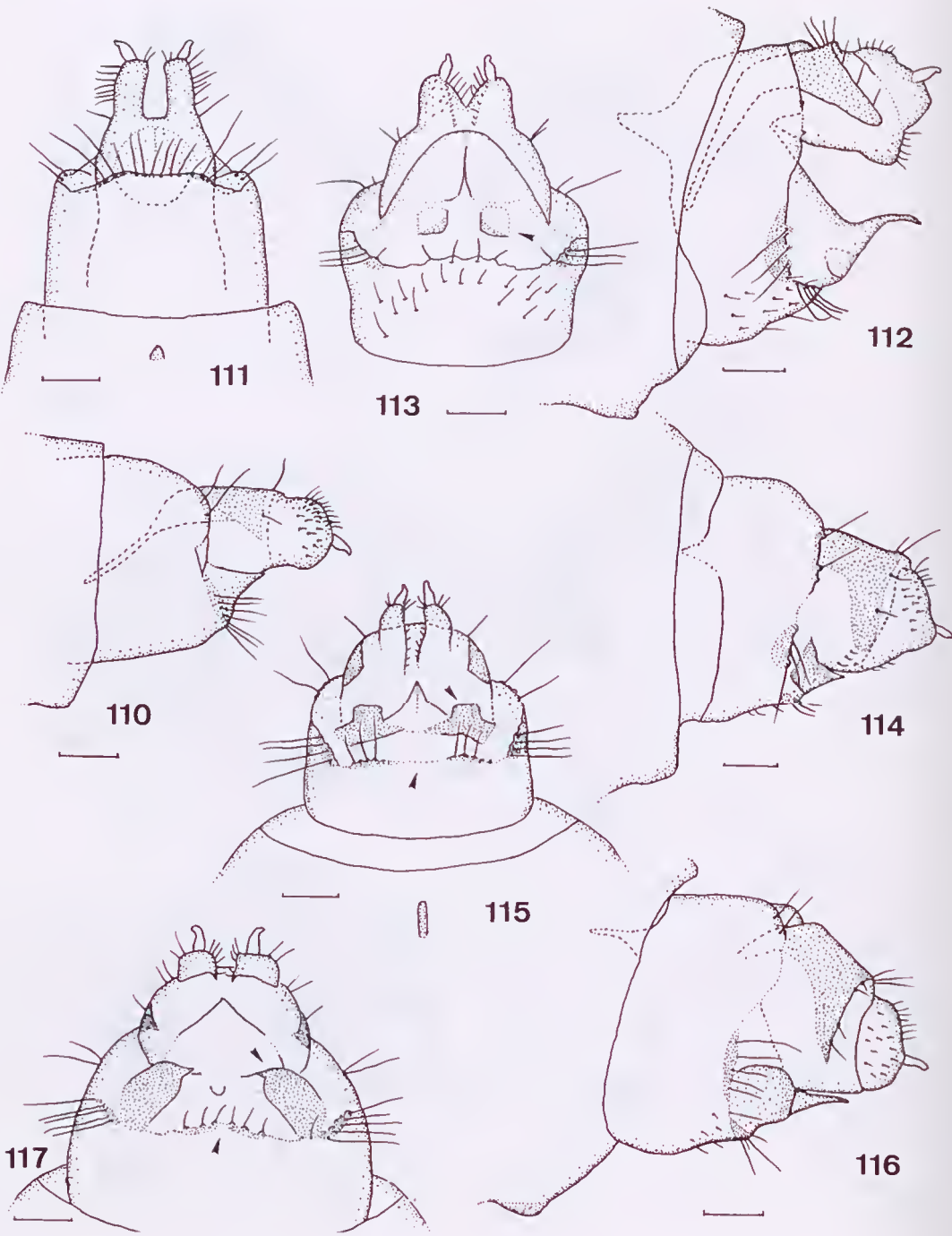




Figures 98–103. *Chimarra* spp. Female genitalia in lateral and ventral views. 98–99: *Chimarra yoolumba* sp. nov. 100–101: *Chimarra nabilla* sp. nov. 102–103: *Chimarra pita* sp. nov. Scale lines 0.1 mm.

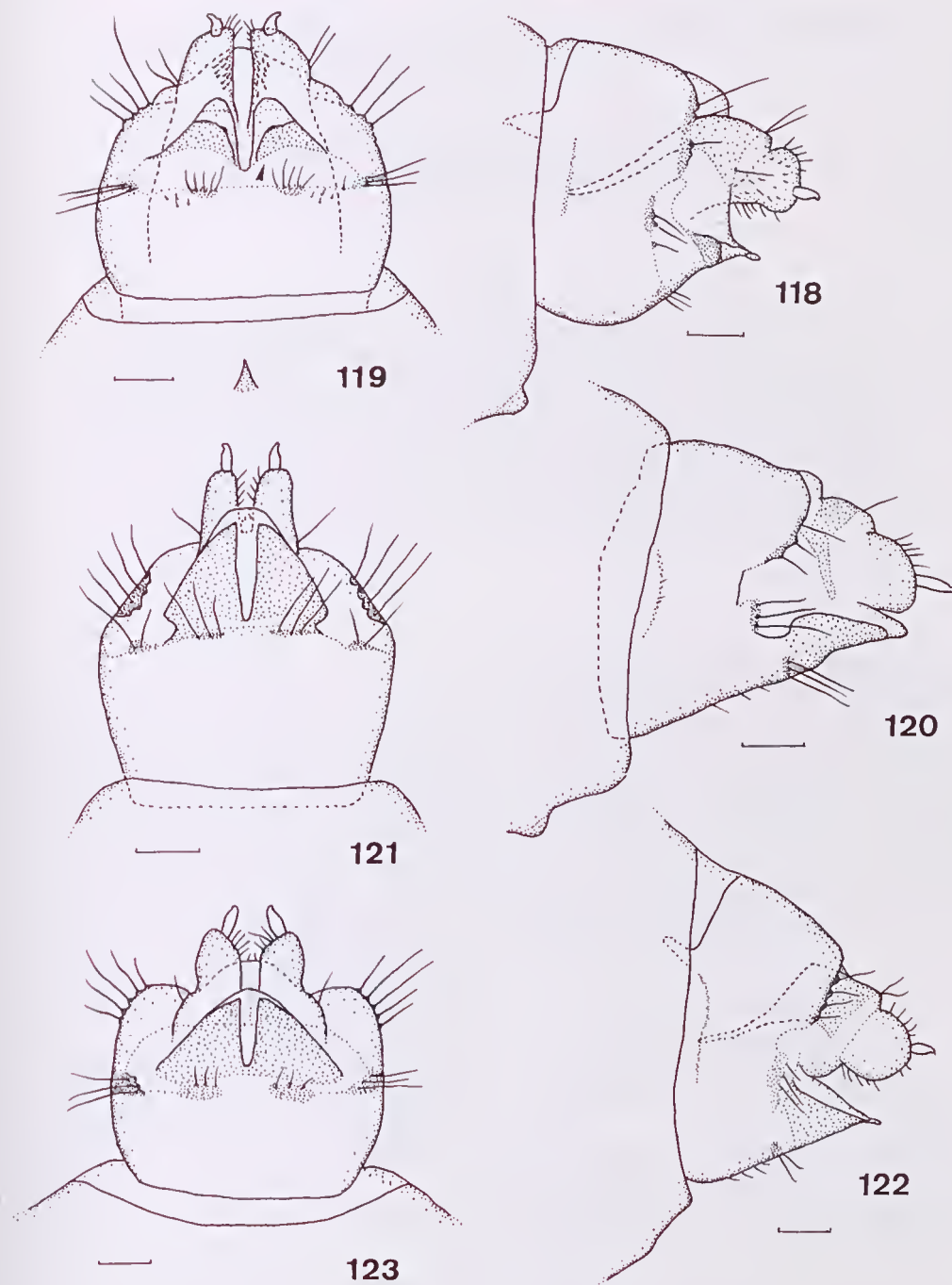


Figures 104–109. *Chimarra* spp. Female genitalia in lateral and ventral views. 104–105: *Chimarra natalicia* sp. nov. 106–107: *Chimarra tallawalla* sp. nov. 108–109: *Chimarra nevoissi* sp. nov. Scale lines 0.1 mm.



Figures 110–117. *Chimarra* spp. Female genitalia in lateral and ventral views. 110–111: *Chimarra wooroonoonan* sp. nov. 112–113: *Chimarra stclairae* sp. nov. 114–115: *Chimarra mouldsi* sp. nov. 116–117: *Chimarra karakara* sp. nov. Scale lines 0.1 mm.





Figures 118–123. *Chimarra* spp. Female genitalia in lateral and ventral views. 118–119: *Chimarra australica* Ulmer. 120–121: *Chimarra kewarra* sp. nov. 122–123: *Chimarra monticola* Kimmins. Scale lines 0.1 mm.

